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CLINICAL RESEARCHES
ON
DISEASE IN INDIA.

BY

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GENERAL HOSPITAL, — AT BOMBAY.

IN TWO VOLUMES.

VOL. I.

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1856.

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TO

JOHN M^cLENNAN,

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, LATE PHYSICIAN-GENERAL
OF THE ARMY, AND MEMBER OF THE BOARD OF EDUCATION.
OF THE PRESIDENCY OF BOMBAY,

CONSPICUOUS THROUGHOUT A LENGTHENED PERIOD OF PUBLIC SERVICE
FOR PROFESSIONAL ATTAINMENTS, ADMINISTRATIVE ABILITY,
AND GENEROUS PHILANTHROPY,

COMMEMORATED, ON HIS DEPARTURE FROM INDIA,
BY THE UNITED TESTIMONY OF THE GOVERNMENT AND ALL CLASSES OF
THE COMMUNITY,

This Work is dedicated,

WITH THE ADMIRATION AND REGARD WHICH LONG FRIENDSHIP
HAS INSPIRED.

REPORT

The doctrine which I have just enunciated is, in substance, the doctrine of the Board of Education, and it is the duty of the Board to enforce it. I have the honor to acknowledge the receipt of your letter of the 10th inst., and in reply to inform you that the Board has decided to adopt the course of action which I have just enunciated. I have the honor to acknowledge the receipt of your letter of the 10th inst., and in reply to inform you that the Board has decided to adopt the course of action which I have just enunciated.

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P R E F A C E .

THE desire which I have long entertained of contributing to the resources of practical medicine in India, has been realised at the present time, in obedience to the wishes of the Honourable Court of Directors of the East India Company, originating in the following minute, which was submitted on the 15th May, 1854, by Dr. McLennan, Physician-General of the Bombay Army, to his colleagues in the Board of Education, approved by them and by the Government of Bombay:—

MINUTE.

“I now beg to submit to my colleagues the proposition to which I lately adverted, when treating of the approaching departure of Dr. Morehead on sick leave. My own impression was, that in all probability eighteen months would be necessary for the purpose of recruiting his health; but in consideration of the special nature of the leave applied for, the Medical Board restricted their recommendation to a period about which there could be no doubt, and, therefore, mentioned twelve months only as the time deemed requisite for his restoration to health and efficiency.

“I would now submit, that the Board of Education make a suggestion to Government, in view to its transmission to the Honourable Court of Directors, that at the end of that period Dr. Morehead be requested to occupy himself in advancing

the cause of Indian Medical Education, by the preparation of a work on the Diseases of India, calculated, not only for the Students educated in Indian Medical Colleges and for Indian Graduates, but also for Medical Commissioned Officers of the Honourable Company's Service on first arrival in India, and till such time as they have acquired that experience which years of service alone supply. The period necessary to bring out such a work, with the materials already accumulated by Dr. Morehead, would probably not exceed another year, and thus the whole term of absence, both on account of health and duty, would not exceed that for which leave within the limits on the old Furlough Rules has hitherto been given.

"It may be well that I should say something of the grounds on which I venture to make this recommendation, and here I would say that Dr. Morehead's experience has been varied and extensive. On first arrival in India he served for two years with European, and for as many years with native troops, at different stations. He was then for two years in charge of the sanatory station of Mahableshwur;—thereafter, for more than six years, resident Assistant Surgeon of the European General Hospital, Bombay—an institution in which the inmates are of very varied circumstances as to habits, position in life, nature of duties, and length of residence in India, &c. In that hospital are accommodated the newly arrived European and the old servant of many years' Indian residence—the seamen of the Royal, Indian, and Mercantile navies—the soldiers of all arms and both services, Queen's and Company's—the townsman—mechanic—clerk—male and female—adult and child—from most classes of life, and many stations in the interior. The opportunity for seeing variety of disease, therefore, under great diversity of circumstance, is considerable.

"Dr. Morehead was likewise for six years Surgeon of the Byculla Schools. In parts of 1843 and 1844 he was in Sind, and had an opportunity of observing the state of health of Europeans and Natives after the sickly season of 1843.

"He has been for nearly nine years Surgeon of the Jamsetjee Jejeebhoy Hospital, and for six years has been engaged in teaching Medicine and Clinical Medicine in the Grant Medical

College; and the records of the Clinical Wards have been carefully preserved during the whole of this period.

“He has been twelve years Secretary to the Medical and Physical Society, during which time there has been afforded him by the Medical Board the opportunity of becoming acquainted with the tenor of the medical reports and cases from all parts of the Presidency.

“In 1833, and again in 1853, Dr. Morehead had the opportunity of observing some of the hospitals and medical institutions in Madras, Calcutta, Colombo, &c. &c.

“Very numerous papers on Dysentery — Dracunculus — Diseases of the Abdominal Viscera — Intermittent and Remittent Fevers — Delirium Tremens — Diseases of the Brain — Hepatitis and Cholera — Measles in the Byculla Schools, &c. &c., have been inserted by him in the Edinburgh Medical and Surgical Journal, Transactions of the Medical and Physical Society of Calcutta, and Transactions of the Medical and Physical Society of Bombay.

“In the last work, too, at a comparatively recent date, five papers, based on observations chiefly made in the Clinical Wards of the Jamsetjee Jejeebhoy Hospital, on the important subjects of Smallpox — Bright’s Disease of the Kidney — Diseases of the Heart — Pneumonia — and Beriberi — have been contributed, and there are records from which to make the same kind of observations in respect to other important diseases treated in the same wards, such as Hepatic Abscess — Dysentery — Fevers — Phthisis Pulmonalis — Paralytic Affections, &c. &c.

“Having thus detailed the sources from which Dr. Morehead’s experience and fitness for the task which I have ventured to suggest have been derived, I may now add a few words as to the nature of that want which I propose he should supply; and here I honestly give it as my opinion, that till some work of the kind I suggest be brought forth, the efforts of Indian Governments and their servants in medical education will be incomplete. At present, Graduates and Students of Indian Medical Colleges are without any book on practice in Indian Disease, as

now generally followed, or as requiring modifications to meet peculiarities of native habit and constitution.

“ The duties of the Clinical Wards in the Grant Medical College have been so carried on, and so recorded, as to constitute an important collection of facts and practice, which may be brought to bear on this want. The labour of collecting, digesting, and condensing for such a work will be considerable, and, as it is valuable for Indian purposes, it should (it seems to me) receive support and encouragement from the Indian Government, which Dr. Morehead has so zealously and usefully served.

“ I, therefore, trust my colleagues will support my proposition, and recommend, that after the expiration of the leave lately granted, Dr. Morehead may have, for the above purpose, another year in England on Indian allowances, and to count as service, with the right of returning to that place in the Grant Medical College, over which he has so beneficially presided.” *

In performing this duty I have endeavoured to embody my experience in a connected form, and to illustrate my opinions by cases which have passed under my immediate observation† and care; while, at the same time, I have not been inattentive to the views of other inquirers.

My clinical researches have been directed to disease, as occurring both in Europeans and in the Natives of India. I have aimed not merely to increase practical knowledge of the diseases usually termed tropical, as malarious fever, hepatitis, dysentery; but, also to show that affections — pneumonia, phthisis pulmonalis, pericarditis, Bright’s disease — familiar to European

* Report of the Board of Education, Bombay, from May 1. 1854, to April 30. 1855, p. 144.

† The few cases not observed by myself which have been inserted, are indicated by an asterisk.

observers, are sufficiently common in India, more particularly in some classes of the native community.

Cases have been introduced chiefly with the object of elucidating the Symptomatology and Pathology of disease. They have been used freely in the form of summaries, which have in every instance been carefully prepared by myself. The graduates of the Indian Medical Colleges, for whose benefit I have chiefly written, may often, for many years yet to come, be placed in positions remote from their professional brethren, and in circumstances ill adapted for the prosecution of pathological research. The recollection of this fact has removed any hesitation which I might otherwise have felt relative to the expediency of inserting so many illustrative details. But, at the same time, I have been careful so to arrange the text of the work, that it may be readily perused independent of the cases ; and so to classify and indicate the cases, that they may be referred to without difficulty by those who may be engaged in the close investigation of the diseases to which they relate.

In my remarks on the treatment of disease I have invariably endeavoured to explain fully the principles, and to state the means by which they may be best applied. Cases illustrative of treatment have been sparingly used by me, because practical conclusions arrived at, after a lengthened course of experience, are grounded partly on cases successfully treated, partly on those which have proved fatal, and partly on

the observations of different method in the hands of others. Therefore the physician, on looking back to the records of his practice through a long series of years, is not likely to meet with many cases calculated to illustrate at all points his matured therapeutic opinions.

Making exception, then, of the few cases which have been detailed in explanation of treatment, I would request the reader to refer exclusively to the text for my views on this important part of my subject. Doubtless the principles inculcated by me will be found applied in the management of many of the cases which have been narrated with a different object; but, on the other hand, I am very sensible that some of them may be fairly open to criticism.

It was my desire to have concluded this work with a chapter on the Diseases of Females and of Children, but the time at my command has come to a close. In respect to some of the diseases of which I have treated, reference has been made to their occurrence in females, and in the early periods of life; and a little reflection will readily suggest the modifications of the pathological and therapeutic principles which I have endeavoured to enforce to the circumstances of difference of sex and of age. Still, the subject is of much interest and importance, and I would indulge the hope that I may be permitted, at some future time, to supply the omission which at present I have been unable to avoid.

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ON THE

DISEASES OF INDIA.

INTRODUCTION.

CLINICAL research implies the investigation of those doctrines of Pathology and Therapeutics which may be reasonably deduced from the careful observation and comparison of numerous individual instances of disease.

As the study of the doctrines and of the instances is most advantageously conducted in connexion with each other, it is unnecessary in the introduction to a clinical work to do more than to take advantage of the opportunity which it presents of alluding in general terms to some of those facts which more or less apply to all forms of disease.

One of the earliest important truths which becomes impressed upon the mind of the practical inquirer is, that the diseases described in systematic treatises are favoured in their access and modified as respects their course and treatment by pre-existing states of the constitution of the affected. On inquiry, it further appears, that these states are in general either original or acquired in one or other of the three following ways:—

1st. By neglect of a right condition of those agencies termed vital stimuli, which are as essential to the physiological performance of function as organic integrity.

They are food, atmospheric air, exercise, and repose of body and mind.

2nd. By undue discharges from the blood or retention of excreta.

3rd. By reception into the blood of external injurious agencies—poisons.

Under one or other of these heads may be classed cachexia from struma, scurvy, vitiated atmosphere, mental states, prolonged lactation, hæmorrhages, albuminuria, rheumatism, malaria, syphilis, carcinoma, mercury, arsenic, lead, alcohol, &c.

Though in the cachexiæ arising in these various ways there may be peculiarities special to each, still there are features common to all. The actions of the system are defectively carried on in all. The nutrition of the blood and of the solids is impaired, secretion is diminished and deranged, nervous influence and muscular irritability are imperfect, and the generation of animal heat is lowered in degree. In the course of my clinical remarks on different forms of disease I shall have to make frequent reference to these states under the designations "Asthenic" and "Cachectic." By the first term I wish to express merely a lowered degree of function; and by the second, defect in quality as well as in degree.

It is very probable that an essential condition of cachectic states is an altered quality of the blood; and we may hope that future pathological research will ultimately determine the speciality of each. The term dyscrasia is used by Rokitsansky in a similar sense; but I have preferred retaining the word cachexia, as more familiar to English readers, and as quite adequate for the expression of our present positive knowledge.

In conducting the treatment of disease the clinical

physician is constantly reminded of the obstacles which these asthenic and cachectic states interpose to the success of his remedies, and of the necessity which is thereby entailed upon him of making the removal of these states a leading indication in the management of the special disease which has been grafted on them. Thus, among others, two important practical lessons are enforced:—

1st. Though the statement and inculcation of the details of sanitary measures are not within the province of clinical medicine, yet the paramount importance to the public health of a well organized system of medical police is a prominent inference from clinical research.

2nd. The advantage derived in practice by the removal of the sick from the influence of the causes of cachexiæ impresses upon the mind of the physician this truth, — That a rational system of medicine is one that includes a just arrangement of the vital stimuli and the removal of lædientia, as well as the use of medicines; and that, when the cachectic states are very marked, then the two first therapeutic principles are the most important.

The principles hinted at in these few remarks will be frequently illustrated in these pages with reference to particular forms of disease.

The importance of regarding asthenic and cachectic conditions of constitution in the treatment of all forms of disease is true of every country. But, when investigation has reference to a particular country, it then becomes a preliminary question with the inquirer to determine whether, as regards the field of his observation, there is any special cause of these states generally operative or not.

In applying this rule to India I would remark that,

in comparing the tropical with the temperate climates of the globe, we find that in the former there are two additional causes of asthenia and cachexia more or less prevailing, viz., the influence of long continued elevation of temperature and of malaria.

The effect of elevated temperature on the European constitution in increasing the biliary secretion has been a constant theme with a succession of able and estimable writers on the diseases of Europeans in tropical climates. The observations on which these opinions rest are undoubtedly correct; but they have reference only to a particular class, and there has consequently been error in deducing from them a general inference.

One effect of elevated temperature on the animal system is less necessity for animal heat; hence less demand for food, diminished metamorphosis of tissue, and decreased excretion. That this is true becomes manifest in the asthenic condition of the residents in warm climates compared with those in cold.

The European soldier or sailor lately arrived in India does not readily appreciate or adapt himself to the alterations in habits of life necessary to the maintenance of health under these circumstances of a warmer climate. The excesses therefore which in the cold climate might be unattended with disorder, are, under the increased predisposition consequent on the influence of elevated temperature, followed by derangement.

Bilious diarrhœa or cholera is in these circumstances very apt to occur, and the theory usually conceived of this event is in all probability correct, viz., that defective elimination of hydrocarbon by the lungs, under diminished heat-generation, is liable to throw on the liver the burden of the elimination of these elements, when they are present in excess in the system. But it

by no means follows from this that, when there is the just relation, between food-supply and excretion, which is implied in the habits of every prudent resident in a warm climate, there obtains more of action of the liver vicarious of the lung, in the one climate than in the other.

Questions which refer to the relative proportion of ingesta to excreta, and of the various excreta to each other, under varying circumstances of the animal system, can only be satisfactorily determined by careful observation and experiment. Researches of this kind on an extensive scale are still amongst the desiderata of physiological science. In the absence of just data, all that I can venture to advance on this subject, in reference to India, is the expression of my belief that, in the normal state of the system, all the solid* excreta are considerably less in amount than in the colder climates of European countries. The evidence that the biliary excretion is not increased, rests on the fact, that in the natives of India, and in Europeans whose habits of living have become adapted to the climate, derangement of this kind is very rarely observed.

From these observations on elevated temperature, as inducing asthenic and cachectic states, I pass to the consideration of the other influence, which was named, — Malaria.

Malaria is the exciting cause of intermittent and remittent fever, and will be frequently referred to in connexion with these diseases. It causes cachexia also, either by means of frequent febrile recurrences, or by the exercise of a slower and a gradual influence on the system.

This subject is well and fully discussed by our best

* I use the term solid, to exclude that water which has been received and eliminated without resolution into its elements.

systematic writers on disease, and it will therefore be sufficient for me to state very shortly the leading facts relative to the generation and action of this morbid cause.

1. We judge of the presence of the invisible agency termed malaria by certain derangements of the animal system which we attribute to its influence; for as yet all other means of investigation have failed in detecting its presence and determining its nature.

2. A certain elevation of temperature acting on the earth's surface previously moistened is essential to the production of malaria. It is generated more certainly while this process of drying is going on, and in degree bears proportion to the rapidity with which the process is effected. Therefore malaria is most abundant in marshy grounds after the quantity of water has been reduced by evaporation and brought to that condition when the drying of the surface of the ground begins and the atmospheric temperature is still high. It is then, after the heats of summer have passed and the autumnal season has set in,—the months September and October,—that in marshy countries malarious fevers prevail.

3. In those tropical regions in which there are periodical rains, generally associated with elevated temperature, the generation of malaria coexists with the periods when the heavy falls have ceased and the drying of the earth's surface is rapidly going on. During the periodical rains of the western side of India, which commence about May and terminate in September, malarious fevers are prevalent sometimes in July, but generally most extensively in October. But there may be variations in respect to the particular months. The necessary conditions are such relation between the rainfall and the temperature as shall bring about the rapid drying of a surface previously soaked with moisture.

4. There are districts of countries, chiefly in the warmer climates, subject to the periodical inundation of large rivers; and, should the subsidence of the waters coexist with elevated temperature, then the generation of malaria, as evidenced by the prevalence of intermittent and remittent fever, takes place. The Ganges, the Indus, the Euphrates, and the Nile are rivers of this kind.

Consequent on the melting of the snows in the mountain regions in which these rivers take their rise the supply of water is increased. They begin to rise about the month of March; attain their greatest elevation, overflowing their banks and covering extensive tracts of country, in the month of September. Then they begin to fall and to expose the surface of the inundated tracts to the rapid drying of the elevated temperature of this season of the year. It is then that malarious fevers in these districts appear in their most aggravated form. It would seem that, whether in tracts habitually swampy, or regions wetted by periodical rains or the overflow of large rivers, still the autumnal season is one of prevalence of malarious fevers.

5. Malaria shows a preference for low levels compared with elevated sites. It often coexists with decaying vegetation, but not unfrequently occurs altogether independent of it in situations where the surface is sandy, dry, bare of vegetation, and where the moisture, that essential condition of malaria generation, must be present in the subsoil.

6. Its influence on the animal system is more surely experienced at night and near to the surface of the ground. Malaria may be carried by currents of wind from the spot where it has been generated, and thus infect adjacent localities; or by the same power it

may be rolled up the slope of a mountain just as clouds of vapour are.

7. Malaria is believed to lose its noxious properties by passing over a surface of water even of small extent. It is, however, attracted by and clings to the foliage of trees, thus rendering them a focus of the poison, but at the same time a protection to tracts of country beyond.

8. Malaria is lessened by cultivation and adequate population, but becomes rapidly increased when lands have been deserted and allowed to run waste.

Such general statements as these, relative to the generation and action of malaria, rest upon evidence which may be found in the Medical Statistical Reports of the British Army, and in the medical histories of military or naval expeditions to the coasts of Africa and Arracan, to Burmah, Java, the peninsula of Spain, and to other countries. They are, moreover, amply confirmed by observations made in my own field of research, or in districts adjacent to it. The fevers which occur in the months of September and October in the provinces of Guzerat, Candeish, and Scinde, illustrate the relation of malaria to elevated temperature and rapid drying of the earth's surface. In the Deccan and at Hursole in Guzerat there is evidence of malaria generation without vegetable decay; while at Deesa they have occurred in association together. The history* of a fever which prevailed among the marines of her Majesty's frigate "Endymion," in the dockyard at Bombay, affords a striking proof of the greater influence of malaria by night than by day. At Tatta and at Hyderabad in Scinde the malaria generated in the

* To be more particularly alluded to in the Chapter on Remittent Fever.

adjacent lowlands was carried by the prevailing wind to the hill slopes upon which the troops were stationed. That malaria is attracted by and clings to the foliage of trees has been in too many instances painfully proved by the record of detachments of troops injudiciously marched at unseasonable periods through the extensive jungle tracts which intervene between the provinces of Candeish and Guzerat. In the fallen condition of the city of Almedabad, and in the state of health of the troops at Hyderabad immediately after the battle of Meanee and the capture of Scinde, we have illustrations of the statement that malaria generation is favoured when districts are deserted, and previously cultivated lands are left waste.*

Exciting Causes of Disease. — Reference has been made to those asthenic and cachectic states which predispose to disease of all kinds, and the importance of a right appreciation of their influence in the etiology of disease in India will be frequently explained in various parts of this work. Malaria has also been named as a predisposing and exciting cause, and it now remains for me shortly to allude to the other ordinary exciting causes of disease in India. Of these, external cold is the most common. In judging of the facility of the reduction of the temperature of the surface of the body in India we must bear in mind the diminished power

* The references made to the dockyard in Bombay, and to Tatta and Hyderabad in Scinde, rest on my own observation and inquiry : those relative to Guzerat, the Deccan, and Candeish on two very instructive and interesting descriptions of the provinces of Guzerat and the Deccan by Mr. Gibson, published in the first and second numbers of the Transactions of the Medical and Physical Society of Bombay ; also on a Report on Candeish Fever by Dr. Graham, in the fourth number, and one by Dr. Brown on the Diseases of the Horse Artillery at Deesa in the first number of the Transactions of the same Society.

of generating animal heat in warm climates or asthenic states; and that consequently in these the temperature of the surface of the body may become reduced under degrees of external cold inadequate to produce this effect in colder climates or stronger constitutions.

In order to a just estimate of this exciting cause of disease, we are bound to study carefully, in respect to the sphere in which we practise, the characteristic features of the different seasons of the year, more particularly those conditions of the atmosphere which favour the abstraction of heat, such as absolute lowness of temperature, diurnal range, moisture, direction, duration, and force of the winds. It is further of importance to consider those atmospheric states in reference to the presence or not of a pre-existing influence of causes of asthenia or cachexia, such as malaria, scarcity, elevated temperature; for it is well known that cold, as an exciting cause, acts very readily on debilitated persons. It would be foreign to the objects of this work, and beyond my ability, to enter upon the consideration of the meteorology of India. On this subject the medical inquirer may consult with interest and advantage the able observations recorded by Colonel Sykes in the *Philosophical Transactions* for the year 1850. But, as much of my own research on disease has been conducted in the Island of Bombay, I have inserted elsewhere* a memorandum with tables on the meteorology of its climate, for which I am indebted to the kindness and industry of Dr. Lownds, of the Bombay Medical Service. Though the elevated temperature of an Indian climate is chiefly influential as a predisposing cause of disease, yet it is not to be doubted that heat sometimes acts as an exciting cause in some forms

* Appendix.

of fever, in cerebral affections, and perhaps in hepatitis, as will be stated more fully when I come to treat of these diseases.

I shall conclude these introductory remarks with one or two general reflections on the pathology and therapeutics of disease in India.

The exclusive observation of disease in sthenic Europeans by a succession of writers on tropical diseases, and the rapid course sometimes followed by bad forms of malarious fever and of dysentery, have created an impression that inflammatory disease in India, compared with colder climates, is characterized by speedy progress and excessive vascular action. When, however, we extend our investigations beyond the limited circle of a single class, we find that this is an erroneous idea. It has been already hinted that the general type of disease in India, both in Europeans and natives, is asthenic; therefore the law in respect to this, which has been observed in other countries, may be inferred to be equally true of disease in India, viz., that inflammations in asthenic habits are generally characterized by obscurity of symptom and slowness of progress.

These features of asthenic disease often induce in India to neglect of application for relief till disorganization of structure has well advanced; and they, moreover, tend sometimes to mislead the practitioner in respect to the stage which has been reached, and thus create the erroneous impression that the morbid changes have been rapidly effected.

This belief in the severity of inflammatory disease in India originating in the manner which has just been explained, naturally gave rise to the doctrine that disease in India generally required to be met by a freer use of antiphlogistic remedies. But, if the state-

ment previously made relative to the prevalence of asthenic forms of disease, be correct, then it follows that blood-letting, mercury, purgatives, and all other antiphlogistic remedies, should be used with greater caution, not with more freedom, in medical practice in India than in colder climates. The pathological doctrines now generally current on blood diseases, and relative to various forms of degeneration of tissue consequent on defective or perverted assimilation, are very valuable in respect to disease in India, and call for an attention on the part of pathologists in that country which has not as yet been accorded to them. They, moreover, serve to inculcate additional caution in respect to the abuse of antiphlogistic remedies, to enhance the importance of the judicious use of tonic regimen* and medicines, and to suggest a careful inquiry into the value and rational use of eliminants.

Remarks on the Statistics of the European General Hospital, and of the Jamsetjee Jejeebhoy Hospital at Bombay.

In my clinical remarks on the various forms of disease treated in this work, frequent reference will be made to the European General Hospital and to the Jamsetjee Jejeebhoy Hospital at Bombay, because much of my practical acquaintance with disease in India has been acquired in these institutions.

The first-named hospital has accommodation for 120 sick. The inmates are Europeans, partly military, partly

* I use the term to signify those just arrangements of food, atmospheric air, exercise and repose of body and mind, and of water as regards the functions of the skin, and its tonic action when cold, which conduce to the maintenance of health and favour the elevation of the animal system from a state of debility to one of strength.

sailors, and partly the poorer classes of the civil community. The wives and children of these classes are also received. I was the Resident Assistant-Surgeon in this hospital for a period of six years,—from June, 1838, to October, 1844.

The Jamsetjee Jejeebhoy Hospital has 300 beds: of these 240 are for males, and 60 for females. It is for the reception of native sick of all castes and countries (Europe excepted). A large proportion of the inmates belong to the poorer classes of the civil population, and many of them are received into the hospital in a very destitute condition. A smaller proportion consists of sick labourers, artificers, lascars, and watchmen who are in the employment of Government. The hospital is open for the free admission, on application, of the sick of those numerous classes for whose relief it is intended. I have discharged the duties of principal Medical Officer of this hospital for a period of nine years,—from 1845 to 1854.

During the period of my service in the European General Hospital 9303 admissions took place; and during that in the Jamsetjee Jejeebhoy Hospital 34,719 in-patients and about 90,000 out-patients have been treated.

I make these statements with the object of showing a portion of the extent and kind of clinical experience on the faith of which I have ventured to express myself with some degree of confidence on several points of pathology and therapeutics. The tables appended to my present remarks are inserted with a similar view, as well as with reference to the few practical inferences which may be deduced from them; and as affording data necessary to the calculations in the tabular statements of particular diseases which will be found in different parts of this work.

Tables I. and IV. relate to periods of my own service in these hospitals. Tables II. and III. have been supplied to me by the kindness of Mr Stovell, the present surgeon of the European General Hospital.

The deductions that may be made from these tables, relative to the proportion of sickness and death in Bombay in different seasons of the year, are not to be received as absolutely correct, because the classes of the community, both European and native, whose sick resort to these hospitals, are a fluctuating body, of whose varying numbers, at different seasons of the year, we have as yet no accurate census. Still the inferences, such as they are, may be stated here.

In the fifteen years from 1838 to 1853 the admissions into the European General Hospital amounted to 20,146, and the average mortality to 6·3 per cent. Of these admissions 10,495 took place in the half-year from June* to November, and 9653 in that from December to May; being an excess of 840 in favour of the first period. But the mortality in the first stated half-year was 5·7 per cent., and that in the second 6·9; being an excess of 1·2 in favour of the latter.

In the six years from 1848 to 1853 the admissions (Table IV.) into the Jamsetjee Jejeebhoy Hospital were 25,190, and the average mortality 16·3† per

* I divide the year in this manner, because in Bombay from June to November includes the rainy season and that immediately succeeding it; therefore the chief malaria generating season. From December to May in Bombay includes the cold and hot months; therefore both the influence of cold and heat, as exciting causes of disease.

† The statistical inquirer, possessing no other information respecting these hospitals than that supplied by the figures, would conclude either that disease is more fatal to natives than to Europeans in Bombay, or that treatment was less judicious in the Jam-

cent. Of these admissions 12,465 took place in the half-year from June to November, and 12,725 in that from December to May; being an excess of 259 in favour of the latter. But the mortality in the first-stated period was 15·4 per cent., and that in the second 17·1; being an excess of 1·7 in favour of the latter.

I learn from Mr. Leith's Mortuary Returns of Bombay that the deaths in five years, from 1848 to 1853, amounted to 68,423; of these, 29,667 took place in the half-year from June to November, and 38,756 from December to May; being an excess of 9089 in favour of the latter period.

The Returns, however, enable us further to divide this mortality into that proceeding from all causes except epidemics (52,450), and that proceeding from epidemic causes, viz., cholera, small-pox, measles (15,973), and to show that in the half-year from December to May there is of the first class (all causes) an excess in the mortality of 2300; and of the second (epidemic) an excess of 6789.

Though the half-year from December to May is that in which the fluctuating population of Bombay is most numerous, still I think it may be fairly inferred from these several statements, that the period which includes the monsoon and succeeding season is that of the greatest amount of sickness not epidemic; but that the half-year which includes the cold and hot months is that of the greatest mortality both from general and epidemic causes.

setjee Jejeebhoy Hospital than in the European Hospital. Both inferences would be erroneous. The explanation is simply this, that a large proportion of the inmates of the Jamsetjee Jejeebhoy Hospital are admitted in a destitute state and in far advanced stages of disease; hence the high mortality.

TABLE I.—*Tabular Statement of the total Admissions and Deaths in the European General Hospital at Bombay for the five Years from July, 1838, to July, 1843, with Per-centage of Deaths on Admissions for the same Period.*

	1838.		1839.		1840.		1841.		1842.		1843.		Total.		Monthly average.
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	
January -	-	-	79	8	76	10	128	12	108	2	158	11	549	43	7.6
February -	-	-	46	3	69	9	81	8	96	5	119	7	411	32	7.7
March -	-	-	56	6	104	9	89	7	118	6	139	5	506	33	6.5
April -	-	-	89	7	131	16	89	5	141	8	131	5	581	41	7.
May -	-	-	129	17	148	13	129	17	224	21	230	12	860	80	9.3
June -	-	-	122	3	154	10	145	7	206	21	154	10	781	51	6.6
July -	-	-	118	5	143	6	148	12	209	9	-	-	718	37	5.1
August -	-	-	137	6	94	4	126	13	178	7	-	-	607	35	5.7
September -	-	-	114	9	93	10	108	9	165	19	-	-	546	52	9.5
October -	-	-	165	5	101	1	224	8	182	8	-	-	722	27	3.7
November -	-	-	191	8	137	10	80	9	206	16	-	-	685	47	6.8
December -	-	-	97	15	96	8	124	4	228	34	-	-	613	66	10.7
Total -	427	29	1343	92	1346	106	1471	111	2061	156	931	50	7579	544	7.1
Deaths per cent. } on admissions }	6.7		6.8		7.8		7.5		7.5		5.3				

TABLE II.—*Tabular Statement of the Admissions and Deaths from all Diseases in the European General Hospital at Bombay for the Five Years from 1844 to 1848, with Per-centage of Deaths on Admissions.*

	1844.		1845.		1846.		1847.		1848.		Total.		Monthly Average
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	
January -	223	15	102	9	80	7	115	6	97	9	617	46	7.4
February -	106	6	129	8	78	6	86	8	117	7	516	35	6.8
March -	135	10	99	3	66	4	88	4	97	9	485	30	6.2
April -	138	8	106	6	91	3	73	8	101	6	509	31	6.0
May -	151	6	151	7	120	9	68	6	93	2	583	30	5.1
June -	154	8	162	8	135	13	102	3	161	1	714	33	4.6
July -	174	10	126	9	150	6	95	5	134	6	679	36	5.3
August -	109	4	91	1	160	1	72	5	117	4	549	15	2.7
September -	95	7	82	2	119	3	87	1	75	9	458	22	4.8
October -	173	12	133	8	123	6	94	5	82	7	605	38	6.3
November -	150	4	84	5	151	7	72	6	102	9	559	31	5.5
December -	116	6	97	7	115	8	109	7	85	12	522	40	7.6
Total -	1724	96	1362	73	1388	73	1061	64	1261	81	6796	387	5.7
Deaths per cent. on admissions -	5.5		5.3		5.2		6.0		6.4				

TABLE III. — *Tabular Statement of the Admissions and Deaths from all Diseases in the European General Hospital at Bombay for the Five Years from 1849 to 1853, with Per-centage of Deaths on Admissions.*

	1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	
January -	94	7	88	8	76	9	117	13	75	2	450	39	8.7
February -	93	4	77	4	61	3	83	6	55	1	369	18	4.9
March -	98	6	92	8	85	6	94	7	71	7	440	34	7.7
April -	94	5	114	5	108	6	110	7	91	2	517	25	4.8
May -	106	4	82	1	103	8	81	4	146	7	518	24	4.6
June -	103	4	103	6	112	11	100	3	154	5	572	29	5.1
July -	86	5	104	10	84	6	120	6	135	6	529	33	6.2
August -	81	14	130	9	80	5	111	6	92	4	494	38	7.7
September -	84	7	74	7	66	4	69	2	63	5	356	25	7.0
October -	81	4	77	8	81	5	75	1	81	5	395	23	5.8
November -	150	6	75	5	106	7	82	5	111	7	524	30	5.7
December -	86	16	81	8	108	9	90	2	243	5	608	40	6.6
Total -	1156	82	1097	79	1070	79	1132	62	1317	56	5772	358	6.2
Deaths per cent. on admissions -	7.1		7.2		7.4		5.4		4.2				

TABLE IV.—*Tabular Statement of the Admissions and Deaths from all Causes in the Jamssetjee Jejeebhoy Hospital at Bombay for the Six Years from 1848 to 1853, with Per-centage of Deaths on Admissions.*

	1848.		1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	
January	294	43	318	56	342	79	459	137	341	82	336	53	2090	450	21.5
February	281	49	255	41	346	53	402	88	303	51	307	37	1894	319	16.8
March	320	56	327	57	396	75	417	89	329	55	360	54	2149	386	17.9
April	290	45	330	35	440	95	355	49	323	73	369	46	2105	343	16.3
May	266	34	354	38	428	59	400	49	371	62	364	45	2183	287	13.1
June	275	44	296	43	386	69	364	54	375	50	387	47	2083	307	14.7
July	327	58	317	52	366	67	339	28	300	45	371	56	2020	306	15.1
August	286	39	333	71	379	60	348	55	323	35	330	68	1999	328	16.4
September	312	29	384	89	363	59	325	50	347	39	331	45	2062	311	15.1
October	278	47	389	63	371	59	338	49	378	59	380	62	2134	339	15.9
November	287	45	370	68	416	54	352	42	349	47	393	75	2167	331	15.2
December	311	64	385	82	419	71	332	61	393	61	464	58	2304	397	17.2
Total	3527	553	4058	695	4652	800	4431	751	4132	659	4390	646	25190	4104	16.3
Deaths per cent. on admissions	15.6		17.1		17.2		16.9		15.9		14.7				

CHAPTER I.

ON INTERMITTENT FEVER.

SECTION I.

GENERAL REMARKS ON FEVER. — DIFFERENT TYPES OF INTERMITTENT FEVER.

THE class of idiopathic fevers in India is limited to intermittent and remittent fever caused by malaria, and to ardent continued fever and febricula excited by ordinary causes. It is, however, a very important class of disease. Of the European troops of the Bombay Presidency, 61·3 *, of the Madras European troops, 27·838 †, and of the Madras Native troops, 27·937 per cent. of the strength, are, on an average, annually affected with fever. It is the cause also of considerable mortality. Of the total deaths occurring among European soldiers in the Bombay Presidency about 23 per cent. are from fever; while among European officers the rate is as high as 28·7 ‡ per cent. When attention is directed to the Native civil population, abundant evidence of the importance of this class of disease also appears. In the

* Medical Statistics of European Troops in the Bombay Presidency. By Mr. Webb. Transactions of the Medical and Physical Society of Bombay, No. I., New Series, p. 77. and 79.

† Mortality and Chief Diseases of the Troops under the Madras Government, &c. By Lieut.-Col. W. H. Sykes, F. R. S. Journal of Statistical Society.

‡ My MS. notes.

Island of Bombay, the deaths from fever, in five years, amounted to 27,212*, which is in the ratio of 40·26 per cent. of the total mortality.

These few facts are sufficient to induce us to enter upon the earnest consideration of this subject, and to justify the clinical detail into which I must necessarily be led.

INTERMITTENT FEVER, DIFFERENT TYPES. — I shall limit my remarks to the three principal types of intermittent fever,—quotidian, tertian, and quartan. The further varieties, double and duplicated tertian and quartan, which have been described by authors, are no doubt true to nature, but they are practically unimportant. Indeed, it may be remarked that when the system of treatment followed in intermittent fever aims, from the very commencement, at checking the recurrence of the paroxysm, by the exhibition of antiperiodic remedies, the character not only of these varieties, but also of the leading types, is liable to be modified and changed, and the opportunity of studying the natural course of the disease to be thereby lost.

For these reasons, then, I shall dwell little upon this part of the subject, and not seek much to inquire whether, as regards it, my observations are in accordance or not with those of previous writers. Still there are some points upon which it is desirable to comment.

It has been very generally stated by systematic writers on disease that, of the three leading types, the tertian is the most frequent, then the quotidian, and lastly the quartan.

The statement, in respect to the quartan type, is certainly correct,—for, in comparison with the others, it is very rare. Of 243 cases of intermittent fever in

* Deaths in Bombay. By A. H. Leith.

Natives of different castes in Bombay, selected for the purpose of clinical instruction, there was not a single instance of the quartan form. I am unable to speak with the same precision of 1344 cases of intermittent fever which passed through the European General Hospital at Bombay, during the period of my service in that Institution; but I am certain that if any quartans occurred, they must have been very few in number.

That tertians are more common than quotidians, is an observation altogether opposed to my experience, and, I believe, it may be added, to that of observers in India generally.

Adverting again to the 243 clinical cases, I find that 211 were quotidians and 27 tertians, and that of five the type had not been recorded. In the European General Hospital the fact of the greater prevalence of the quotidian type, more particularly during the malarious months, in first attacks, in seamen, the military staff of the garrison, and the poorer classes of the fixed resident European community, has also been noted by me. Nor has my observation on this point been limited to the Island of Bombay. At an earlier period of my service, while doing duty with Her Majesty's 4th Light Dragoons, at Kirkee in the Deccan, I have recorded in my notes the same fact of the cases of intermittent fever which occurred in that regiment during the monsoon season.

Though the quotidian is undoubtedly the most frequent form of the disease in India, still the tertian is also of common occurrence. Nor is it difficult to point to the circumstances under which these two types respectively present themselves.

Quotidians will be found to prevail most generally at those seasons of the year when the generation of

malaria is believed to be actively going on, and may probably be received as evidence of the recent introduction into the system of the morbid cause. It is the type, then, which for the most part the disease assumes in first attacks.

Tertians, on the other hand, will be found very generally to occur in individuals who have suffered more or less on previous occasions from attacks either of the quotidian or the tertian form, and in whom the fresh attack is often fairly traceable to the influence of ordinary and recently applied exciting causes, as of sudden alternations of temperature or atmospheric moisture, fatigue, debauch, &c.

The occurrence of this type, then, may frequently be received, not as the evidence of a recent introduction of malaria into the system, but as that of a pre-existing abiding influence, sometime dormant, now re-excited into action by an ordinary cause.

Under these views, then, we may expect to meet with quotidiens chiefly from May to October in districts within the range of the rains of the S. W. monsoon; in November and December from the influence of the north-easterly monsoon, and from August to October, in those tracts subject to river inundation and recession. Tertians, on the other hand, may be looked for in the colder months of the year, December, January and February. Also in the course of the monsoon season, on the occurrence of sudden changes of atmospheric temperature or moisture.

Moreover, if it be true that the tertian type is the evidence of a pre-existing malarious influence, then we would expect it to appear in a large proportion of instances in individuals known to have resided in malarious localities; and to be frequently complicated with splenic

enlargement. Of the twenty-seven clinical cases of tertian fever already alluded to, I find that the atmospheric vicissitudes of the monsoon season were influential on eighteen. Of these, sixteen were dockyard peons*, and in fourteen splenic enlargement was present. In the European General Hospital, it was observed by me that the tertian type

* Of the 243 clinical cases, 85 were dockyard peons, many of them, however, readmissions, as the period extends to six years. I was previously familiar with the dockyard at Bombay as a malarious locality, from my experience in the European General Hospital, to which I shall have to allude in connection with remittent fever. The frequent admission of these peons into the Jamsetjee Jejeebhoy Hospital, confirmed my former impressions, and I requested Dr. Bhawoo Dajee, at the time one of my clinical clerks, to ascertain from one of the peons the leading facts connected with their service; and the following is a summary of the information thus obligingly obtained for me:—

There are fifty dockyard peons. They wear a blue woollen dress which they may lay aside for a cooler material in the hot weather. Their pay is sufficient to supply them with the food of good quality and adequate quantity, used by their class. About one-half are Hindoos, the other Mussulmans. They live within the precincts of the dockyard. Their place of sleeping varies according to the duty of the day. They sleep in the open air in the dry season; in a shed during the monsoon, but still liable to be exposed to air currents. They are on duty four hours in the day and four in the night. These periods are respectively divided into a service of two hours, and an interval of rest for four hours; for example, a peon serving from 6 A. M. to 8 A. M. returns at noon, precisely, to serve two hours more — 12 till 2 P. M. The same order is observed in respect to the four hours night duty. While on duty they are walking about as guards of the stores, &c. In the day many use an umbrella to protect themselves from the heat of the sun, but many do not. They do not get wet in the monsoon, for they resort to guard-rooms and sheds for shelter. The sickness from fever, which they are aware is considerable, and chiefly in the rains, is attributed by them to the air and water of the place. There is no complaint of want of attention to cleanliness, nor are they annoyed by disagreeable odours. The water they use is not brackish.

was present most generally in individuals who had suffered from the more obstinate intermittents of the autumnal months of other localities, and who were either sent to Bombay, with the view to benefit from change of climate, or who arrived there at certain seasons in the round of their professional avocations. They consisted almost entirely of European seamen, generally of the Indian navy, who had acquired the disease in the course of service in the Persian Gulf, the Red Sea, on the Coast of China*, or in the steam flotilla of the river Indus. They reached Bombay generally after the opening of the season, subsequent to the monsoon, viz., in the months of November, December, and January; and, under exposure to the atmospheric vicissitudes of these months, became liable to tertian attacks. The evidence of a cachectic state of the system and of splenic enlargement were also frequently present in this class.

These opinions on the conditions of the relative prevalence of the quotidian and tertian types, might, I believe, be readily strengthened by a reference to other sources than my own notes and experience. But they are not brought forward with any claim to novelty, nor with any desire particularly to enforce them. They have seemed to me to express a generalization practical in its tendency, and the best which in the present state of my knowledge I am able to propose.

* This was at a time when military operations were being carried on in China.

SECTION II.

SIMPLE INTERMITTENT FEVER.—SYMPTOMS, PATHOLOGY, AND TREATMENT.

SYMPTOMS.—The different intervals of twenty-four, forty-eight, and seventy-two hours, which distinguish the quotidian, tertian, and quartan types of intermittent fever are so fully explained in all systematic treatises on disease that it is quite unnecessary to enter upon the subject here. The passage, however, of one type into another, not unfrequently observed, is a circumstance of some degree of practical importance. The quotidian sometimes becomes tertian in its character, before it finally ceases, and this change in type is an indication that the disease is in progress towards recovery. On the other hand, the tertian (and it is occasionally observed in the quartan also,) may pass into the quotidian type, or the quotidian may assume the remittent form. When this occurs there has been aggravation of the disease; and close inquiry will sometimes show that this has been coincident with the access of inflammatory action in some important internal organ. The passage of the tertian into the quotidian type, and the quotidian into the remittent, should always suggest this suspicion, and direct our careful attention to the state of all important organs.

In systematic works, it is generally stated, that the period of access of the quotidian is the morning, of the tertian about noon, and of the quartan the afternoon. Of the 243 clinical cases of which 211 were quotidian, 27 tertian, and none quartan, I find the period of access

is noted in respect of 155 cases. Of these the period was between 6 A.M. and 2 P.M. in 74, and after 2 P.M. in 81. This statement, then, is not in accordance with that of systematic writers. But the accuracy of former observers is not, in consequence, to be called in question, for I have already explained that the treatment of the disease by the early exhibition of antiperiodics tends to destroy its natural characters; and when not at once successful in preventing the recurrence of the paroxysm, very often makes it postponing.

The division of the febrile paroxysm into the cold, the hot, and sweating stages; the greater duration of the first in tertians and quartans, and the greater duration of the second and indeed of the entire paroxysm in quotidians, are well known facts. The detail* of the phenomena characteristic of these several stages need not be repeated; but there are facts in respect to each which it is important to keep before us in practice.

First, of the *cold stage* it should be recollected that the action of the heart is depressed from the sedative influence of the morbid cause, and that the blood tends to circulate languidly and to accumulate in important internal organs.

Sometimes the congestion is more than usually present in particular organs: in the brain giving rise to undue drowsiness and sense of weight in the head, ringing in the ears, and various undefinable sensations; in the lungs, the heart, and great vessels occasioning a sense of great præcordial oppression, a respiration unusually hurried and sighing, and a pulse very feeble

* If the reader has not these details present in his mind, he should refer to some systematic treatise; otherwise the occasional facts to which allusion is chiefly made in the text will assume undue prominence in his estimation.

and depressed. Or the undue congestion may be to the stomach and liver, and occasion much retching and vomiting, and deranged biliary secretion; or it may be to the mucous membrane of the intestinal canal, and be attended with copious intestinal discharges. It should be further recollected that, associated with these several local phenomena, we have some degree of the general depressed state of the circulation characteristic of the cold stage, and indicated by a feeble pulse, a pale skin, and features more or less contracted. In the occasional cases in which these undue local phenomena present themselves, the duration of the cold stage is generally prolonged, and the degree of the hot and sweating stages is often so slight as readily to escape notice.

The importance of the exceptional cases to which I at present allude, is not that they are generally attended with hazard to life, for such is not the case; but it lies in the fact, that their nature is very often misunderstood. They are apt to be looked upon as instances of local congestion or other derangement, independent of malarious influence, and in consequence to give rise to needless alarm, and to prompt to injurious and unsuccessful treatment.

The right diagnosis of these cases can only be established by a careful consideration of all the circumstances relating to each particular instance; such as previous attacks or not of malarious fever, exposure or not to malarious season or locality, the periodicity or not of the phenomena. Inquiries bearing upon these points, coupled with due attention to the habits of the individual, and a careful scrutiny into the physical condition and the state of the functions of all important organs, will generally conduct us to a safe and satisfac-

tory conclusion. I would, however, further observe, that we must not expect in every instance to find that previous attacks of malarious fever have been experienced, for I have known several in which this had not been the case.

The kind of phenomena of which I have just been treating have frequently been described under the distinct head of "*Masked Intermittent*." But as they seem to me to be more related to one stage than to the entire paroxysm, there is a practical advantage in noticing them in connexion with that stage alone.*

Hot Stage.—The degree in which the phenomena of febrile reaction are present varies in the different types of the disease, and has moreover a relation to the character of the constitution of the individual affected. The excited circulation, the increased heat of the surface, the diminished secretions, the thirst, the coated tongue, the restlessness, and the headache, are all present in greater degree in the quotidian than in the tertian type; in the sthenic constitution of youthful Europeans lately arrived in India, than in the more or less asthenic condition of the old resident European, and of the different classes of the native population.

The state of the tongue is in many respects a useful practical guide: it will frequently be found to present a more coated appearance in attacks of ephemeral fever than in true intermittents. While in these it may be observed, that the degree of the furred state has not only relation to the duration of the hot stage of each paroxysm, but also to the state of the individual's constitution. It is more coated than in the quotidian

* The occasional occurrence of great and dangerous congestive phenomena at the outset of malarious fevers will be noticed in connection with the remittent type of fever.

type and in sthenic constitutions, than in the tertian type and in asthenic constitutions. Indeed, it frequently happens in tertians, sometimes even in quotidians in asthenic natives, that the tongue is nearly quite clean throughout the paroxysm, as well as the intermission. Again, in tertian fevers, on the morning of the day of the paroxysm, we are occasionally, by the coated or clean state of the tongue, enabled to judge of the probability of the attack.

It is useful to bear these facts in mind ; but in order to their right application it is necessary to recollect another important fact. It is this, that by the undue use of mercurial and other purgatives, and of preparations of antimony, in fever, we may increase and keep up a coated state of the tongue, and thus do positive harm as well as vitiate the indications of a valuable symptom.

Sweating Stage.—The disappearance of the febrile phenomena, after more or less sweating, and the succession of a complete intermission, is the usual course observed in this disease. When we come to treat of remittent fever, I shall have to dwell at some length on the fact, that occasionally instead of the usual remission of the febrile phenomena, we have a state of dangerous—it may be fatal—collapse and exhaustion. Though it be very true, that for the most part we are safe from the apprehension of an event of this kind at the close of a paroxysm of intermittent fever, still there are circumstances under which we must be carefully on our guard. In all instances of intermittent fever in very asthenic individuals, whether Europeans or natives, we must attentively watch the degree of exhaustion which attends the close of the paroxysm. If we neglect this precaution, we may from time to time expect to experience the pain of

learning that our patient has died suddenly, and to us unexpectedly, with perhaps merely symptoms of general exhaustion; or it may be that some degree of diarrhœa, or tendency to coma, has preceded the fatal issue. If in the kind of cases to which I now allude we are satisfied with judging of the progress of the disease by the degree of the hot stage, we shall often be led into very serious error; for it often happens that a diminution in the degree of the phenomena of febrile reaction precedes death by exhaustion. Indeed, a pulse failing in strength, an increasing emaciation, and a decreasing degree of the hot stage, ought to lead us to anticipate early and rapid sinking at the close of a febrile paroxysm, and to provide against it by assiduous and appropriate attention to the use of stimulants and nourishment. My attention was first called to these clinical facts in respect to natives in the year 1831, when in medical charge of detachments on field service, at Sassoor in the Deccan; then in January 1844, while serving at Hyderabad in Scinde, with the 15th Regiment Native Infantry, and latterly in the clinical and other wards of the Jamsetjee Jejeebhoy Hospital at Bombay. As regards the same facts in Europeans, the most striking instance which I can bring to my recollection is that of an officer of the 15th regiment at Gharra in Scinde. He had suffered some months previously from several attacks of intermittent fever while at Hyderabad. I saw him during the recurrence of an attack at Gharra, and there the single paroxysm was succeeded by a state of alarming collapse, requiring the free use of alcoholic stimulants for its removal.

PATHOLOGY.—That in the cold stage of intermittent fever there is a sedative influence exercised by the

morbific cause on the actions of the heart, and a tendency in the blood to move languidly and be delayed in the capillary system of important internal organs, may be very safely affirmed. But whether this influence is first operative on the blood, and through it on the fibre of the heart, or intermediately on the nervous system, or in any of the other various ways which the imagination may suggest, and what the kind of changes effected in the blood may be, are questions which have been much discussed, without as yet having led to a satisfactory solution of the difficulties with which the subject is beset.

Into these speculations I shall not enter. They are foreign to the spirit of safe and useful clinical instruction.

The *mortality* in India, resulting directly from simple intermittent fever, must be very low indeed. I am not aware of the existence of data which truly represent it. During my service in the European Hospital, the returns show a mortality of 1·33 per cent. from intermittent fever. But the complicated cases are also included; and, from the greater number of deaths having taken place in the months of December, February, March, and April, it is evident that this result must have arisen from the sequelæ of the disease.

Though the immediate risk to life from the paroxysm of intermittent fever is very small, still the mortality to which it indirectly leads is very great, and does not find expression in statistical tables as at present framed.

Continued exposure to malaria, or frequent recurrences of intermittent fever, engender, as is well known, a cachectic state of the system, in which the nutritive processes of the tissues and of the blood are defective and perverted, and in which splenic and hepatic enlarge-

ment, and other local congestions of blood, tend to occur. These states, by their persistence and their increase, not unfrequently lead to death by asthenia. But it is not in this way that the indirect mortality from intermittent fever is chiefly caused. It takes place because the cachectic state of the system engendered by the fever is one particularly predisposed to local inflammatory or congestive attacks under the influence of external cold. The structure most especially liable to be thus affected is the mucous lining of the intestinal canal; and the diseases induced are classed, in our returns, under the heads diarrhœa and dysentery. There can be no question that much of the mortality recorded in India under the head "bowel complaints" is, though indirectly, yet fairly chargeable to the account of malarious fevers. The chief season of malarious fevers proceeding from the influence of the generation of fresh malaria, and consequently the chief season during which this deterioration of the system takes place, may in general terms be stated to range from the month of June to the end of November. Succeeding these are the months of December, January, February, and March, with their lower absolute temperature, their greater range, their frequent chilling winds. It is in these months, then, that the asthenic constitution is liable to suffer from dysentery and diarrhœa.

If the malarious season be preceded by one of exhausting heat, and succeeded by one of considerable reduction and alternations of temperature, whether from high diurnal range or the prevalence of chilling winds, then we have conditions of climate from which much mortality, from the consequences of intermittent fever, may from time to time be looked for, unless prevented

or lessened by the constant exercise of a careful and intelligent forethought.

It would be easy to accumulate illustrations of this pathological truth, but I shall satisfy myself by referring to the most striking which have passed under my own immediate observation. After the conquest of the province of Scinde, in the spring of the year 1843, troops were stationed in the fort and town of Hyderabad, and in many of the villages around. In the month of July the canals were sensibly filling by the waters of the Indus; and during the latter part of that month, as well as in August, the inundation was at its height. The subsidence of the waters commenced in September and continued during October.

The 15th Regiment, Native Infantry, was stationed during the months of June, July, August, and part of September in a small village close to the west bank of the Indus, surrounded by broken ground, water-cuts, and cultivated fields interspersed with trees and having a good deal of underwood. It was then moved to another position not less malarious, and finally located in the fort of Hyderabad. There I assumed medical charge of this regiment, at the end of December; continued with it at Hyderabad throughout the greater part of January, and accompanied it down the Indus to Tatta, thence to Gharra (where we were detained about fifteen days); and finally by Kurrachee to Bombay, which we reached towards the end of February.

The following statement shows the strength of this regiment, with the numbers ill from fever, and the *total* mortality during the greater part of the period above adverted to: —

15TH REGIMENT, BOMBAY NATIVE INFANTRY.

1843.	Strength.	Fevers.	Total Deaths.
June	887	97	1
July	958	44	4
August	1012	153	3
September	1046	580	6
October	1024	973	6
November	998	1095	32
December	948	896	25

The great increase in the fevers in September and October is well shown, and, of those under treatment in November and December, a large proportion remained from the admissions of the two preceding months; thereby showing the obstinacy of the disease, and the frequent occurrence of the sequelæ.

In the month of November the temperature at Hyderabad begins to fall, and continues to decline in December and January. North-easterly winds also begin to blow, and are frequently fresh and chilling. The comparison of the mortality of November and December with that of the months preceding is very striking. The great increase was caused chiefly by dysentery. I have not in my notes the numbers* for the months of January and February, but the high mortality continued, and from the same cause. There were, moreover, frequent bronchitic and occasional pneumonic complications, and in some instances death took place apparently from œdema of the lungs.

During part of the year 1843 the Bombay 2nd European Regiment was divided: one wing was stationed at

* The numbers given above, and those stated in Mr. Carter's paper on the prevalence of intermittent fever, &c., in Sindh (Transactions, Bombay Medical and Physical Society, No. 8. p. 32.), will be observed to be the same. Both are taken from the same source, my MS. notes.

Kurrachee in Scinde from the month of May, was healthy and lost few men ; the other wing was stationed at Bhooj, in the province of Cutch, during the monsoon, and suffered much, chiefly in the month of September, from intermittent fever, which frequently assumed the remittent form. The sick were sent to Mandavie, on the coast of the province, with a view to their transport to Bombay. There they were delayed about a month, badly supplied with quinine and other necessaries ; and then, instead of being sent to Bombay, were shipped to Kurrachee, and arrived there in the month of November. About the middle of December, through the kindness of Mr. Cahill the surgeon of the regiment, I was permitted to visit the hospital at Kurrachee. It contained 237 sick, chiefly men from Cutch, and there were still upwards of 100 sick left behind at Mandavie. In many the spleen was enlarged, and some were anasarcaous. The deaths at Kurrachee from among these cases, from the beginning of November to the period of my visit, had been forty in number, and were chiefly caused by dysentery.

During the monsoon of 1841, Her Majesty's 17th Regiment was stationed in the barracks at Colaba, in the island of Bombay. That season of this year was generally unhealthy in the island, and the following admissions of malarious fever took place in this regiment :—

In June	-	55	In November	-	180
July	-	136	December	-	180
August	-	165	January	-	50
September	-	187	February	-	38
October	-	375			

Dr. A. S. Thomson, from whose report* this statement

* Transactions, Medical and Physical Society of Bombay, No. 5.
p. 84.

is taken, thus observes: "In October a few cases of dysentery occurred; but when the cold nights of November and December came, dysentery became more prevalent, and 130 cases were admitted during these two months, and 23 died."

During the month of October, 100 of the fever cases of the 17th Regiment were treated in the European General Hospital, all of which came under my observation, and many under my immediate care. I had therefore a personal knowledge of the character of the fever and of the condition of the men.

TREATMENT OF SIMPLE INTERMITTENT FEVER.

TREATMENT.—The treatment of this disease must be considered with reference to the means which are to be adopted in the several stages of the paroxysm and during the intermission.

If the *cold stage* threatens rather than has actually commenced, and it be only the first or second paroxysm; if the tongue be coated, expanded, and not florid, and the constitution of the individual be good, and evacuant remedies have not been previously exhibited, then an emetic of ipecacuanha may be given with advantage. But when the cold stage has fairly formed, then all that can be done is to endeavour to lessen the discomfort of the patient by clothing, the use of external heat to the extremities, and the exhibition of warm diluents. It may occasionally happen, in cases in which the depression is very great, that the use of ammoniated and other stimulants is indicated; but this is seldom necessary in Indian intermittents, except in very asthenic individuals.

In the *hot stage* we have excess of vascular action, and the indication in the management of this stage is to carry the individual on to the sweating stage with as little of this excess of action or of derangement of different functions as can be safely effected. To prevent this stage or materially to cut it short is beyond our power, but by judicious management we may hope to lessen the discomfort and the amount of derangement of particular functions that attend it.

In youthful sthenic Europeans, at the commencement of first attacks, when the febrile excitement runs high, with headache and much flushing of the face, and a pulse full and firm, then general blood-letting, to the extent of sixteen or twenty ounces, will occasionally be an expedient and useful proceeding; but, when carried further than this, or used at more advanced periods or in other states of constitution, it is not only unnecessary, but it is positively injurious; it hurries on the cachectic condition, and not only does not check the progress of the disease, but tends to protract it.

Under the usual circumstances in which intermittent fever presents itself in India, it is sufficient to endeavour to lessen the vascular excitement by light clothing, by the removal of all lædientia, sponging the surface of the body repeatedly with tepid water, cold applications to the head, and the use, in moderate doses, of antimonials, ipecacuanha, aqua acetatis ammoniæ, or nitrate of potash. In cases in which headache is much complained of, and no contra-indication exists, leeches may be used with advantage in the first or second paroxysms. If the tongue be coated, expanded, not florid at the tip and edges, the bowels confined, and the stomach not irritable, and the paroxysm be the first or second, and not far advanced,

then an emetic of ipecacuanha, to be followed by a moderate purgative, should be had recourse to. These evacuant means are adopted partly with the view of lessening the vascular excitement, but chiefly with that of preparing the system to admit of the fullest influence of the means of cure which are to be followed during the period of intermission.

The extent to which purgatives may be given, and whether they ought to be mercurial or not, will depend upon the state of the constitution, the duration of the disease, the appearance of the tongue, the character and amount of the alvine excretions, and the coexistence or not of hepatic and splenic congestion. On this point of practice it may be received as a useful practical rule, that when the constitution tends distinctly to become asthenic; when the disease has endured for some time, and purgative remedies have not been neglected in the early stages of treatment, — then it matters not what the state of the tongue or of the alvine excretions may be, or what the condition of the liver or the spleen. The period for *much* further evacuation from the blood has passed; for, if now practised, it will increase the asthenic state, and irritation of the intestinal mucous lining will be apt to pass into dysentery.

During the *sweating stage*, under ordinary circumstances, there is little to be done. We must by adequate coverings protect the surface from the risks of too rapid evaporation on the one hand, while on the other we avoid the excess of sweating that will result from keeping the surface of the body unnecessarily warm with too much covering. While these principles are sufficient for the most part to guide us in the management of this stage, still we must bear carefully in mind what I have already stated in respect to the

occasional occurrence of great and unlooked-for exhaustion. When the circumstances are those which I have described as serving to forewarn us of this event, then we must leave no appropriate means of strengthening the patient untried, and we must be prepared, towards the close of the paroxysm, to use stimulants and animal broths freely.

Such then are the means of treatment to be adopted in the several stages of the paroxysm. They do not aim at checking or materially cutting short these stages. We are not acquainted with any means that possess this power, but we must rest satisfied with an endeavour to control somewhat the deranged actions. We must be particularly careful in preserving the strength of the patient, not by the injudicious use of food which the system cannot assimilate, but by guarding against a too evacuant and depressing course of treatment.

The excessive and injudicious use of blood-letting, of emetics, purgatives, mercurials, antimonials, is not only prejudicial, by favouring the development of a cachectic state, but it also distinctly favours the recurrence of the paroxysm and the protraction of the disease. Nor is it difficult to explain this. The malarious influence affects with greater severity and clings with greater tenacity to debilitated constitutions. It matters not whether the debility has been induced by medical treatment or by other causes. Under an increasing asthenia tertians may be observed to become quotidian, and quotidians to become remittent; and I am satisfied that this unfavourable course has not unfrequently been occasioned by the increasing asthenia caused by too depressing treatment.*

* I write with this confidence, not merely from the negative evidence of success attending the opposite course of treatment, but from

I pass now to the consideration of the treatment during the period of *intermission*. It has been stated, that the treatment during the paroxysm should be as little debilitating as possible; but nothing so certainly debilitates and brings about the cachectic state, with all its attendant evils, as the frequent recurrence of the febrile paroxysm. To prevent this recurrence then is the leading indication in the treatment of this disease, and it is most fortunate that in the disulphate of quina we possess a certain means of effecting this object.

The very earliest intermission should be taken advantage of, and quinine be at once exhibited. The best mode of using this remedy is to give it in doses from four to ten grains, more or less frequently, according to the severity and obstinacy of the case. The nearer it is given to the period of the expected accession the more efficacious it will prove to be. For example, if we are acquainted with the probable period of accession, the quinine may be commenced four hours before, and be repeated every second hour. Thus the third dose will fall to be given about the time of commencement of the expected paroxysm. Then the quinine should be continued, in perhaps decreasing doses and lengthening intervals, for four or six hours after the period. If the paroxysm has been prevented, the quinine is to be resumed on the following day in the same manner, and repeated on the third or fourth succeeding ones, but in decreasing doses, and at longer intervals after the second or third day. If the type has been tertian, quinine may be given in

the positive evidence of having witnessed the evils I describe. I have before me cases, to be afterwards quoted, of my early practice in India, which prove these truths, and show that they were then not familiar to me.

smaller quantity on the intermediate day than on that of the expected recurrence.

In the event of the quinine not having been successful in preventing the paroxysm, then on its return we are to omit the use of the quinine, and resume it on the following day in larger doses.

In the intermittent fever of Bombay, and I believe I may add of India generally, from four to six grains will be found for the most part to be a sufficient single dose of quinine. The instances are very few in which it is necessary to give so large a dose as ten grains. It is an object with many practitioners (and I know some very excellent ones who entertain this view) to give quinine till those feelings of giddiness and deafness, to which the name cinchonism has been applied, are produced; this being considered the evidence of the influence of quinine on the system, just as tender gums are of that of mercury.

I have never prescribed quinine on this principle, for I am very certain that intermittent fever may be perfectly well cured without the induction of cinchonism; and I have known cases resist doses of quinine which have caused cinchonism.

I believe that clinical experience soon leads us to a knowledge of the dose of quinine appropriate for the purpose in each particular instance of fever, just as it does in respect to the doses of other medicines in other forms of disease; and I am slow to approve any principle of therapeutics which tends to depreciate that quick perception of the varying phenomena of disease, on the rightful exercise of which, it seems to me, the success of medical practice must always depend. In my observations on the treatment of the hot stage of the paroxysm I entered a caution in respect to the

undue use of purgative remedies. It is necessary to allude to this subject in connection with the treatment of the intermission also.

If the case come first under our notice at the period of intermission, and the bowels be confined, we are not on this account to refrain from the use of quinine; we may give some appropriate laxative at the same time. The addition of two drachms of sulphate of magnesia to the first two doses of the quinine is often an appropriate means. I use the term laxative advisedly, because, though, in the period of intermission, it must always be an advantage to remove an existing state of constipation, it is never so to cause copious alvine discharges. I believe that an active purgative taking effect during the intermission is an action counter to that of the quinine, and favourable to the access of the paroxysm.*

In the treatment of intermittent fever, then, the leading indication is to take advantage of the earliest intermission; and, by the exhibition of an efficient antiperiodic remedy, to prevent a recurrence of the febrile paroxysm. The only remedy of this class which I have as yet named is the disulphate of quina†; and, so far

* On this subject I add the following observation made by me in my report on the fevers of the European General Hospital in 1843 (Transactions, Med. Phys. Society, Bombay, No. 6.): —

“There is also room for caution in the use of purgatives in intermittent fevers of long standing, for in one or two instances I have witnessed the confirmation of the following remark recorded by Cullen: ‘But can say that Sydenham and many other practitioners have observed that we are in danger of bringing back intermittent fevers if we employ purgative medicines soon after we have stopped them with bark; and we have the same observation in De Haen.’” — *The Works of Cullen*, edited by John Thomson, M.D., vol. i. p. 642.

† The trials which I have made of the cheaper amorphous quina

as my experience goes, it is the only one in which confidence can be placed.

Of the antiperiodic properties in intermittent fever of the *liquor arsenicalis* I have not been able to satisfy myself. I used it occasionally in the European General Hospital; also in the 15th Regiment at Gharra in Scinde, when a deficiency in the supply of quinine left me no other resource. The impression then made upon my mind was, that the antiperiodic property, if existing at all, was present in very limited degree. More lately I have again tried the *liquor arsenicalis* in the clinical wards of the Jamsetjee Jejeebhoy Hospital; and I have now before me the notes of seventeen cases in which it was used. In eleven of these it altogether failed, and was omitted; in one recovery took place under the use of an infusion of chiretta; in the others quinine was substituted, and in one of these cases the disease was at once checked by a four-grain dose. In six cases recovery took place under the use of the *liquor arsenicalis*, but slowly; in all there were three or four recurrences of the paroxysm, with decreasing severity, before the final cessation of the attack; and in all the disease was mild. The doses used by me were six or eight minims, given in the same manner and with the same intervals as observed in respect to quinine.

My experience of the *sulphate of bebeerine* has been limited, but, so far as it goes, it is not encouraging. I have before me four cases in which it was used in ten-grain doses: in one it failed, and caused nausea and vomiting; in a second checked the recurrence of the paroxysm, but caused vomiting, and was discontinued; in a third there was bronchitic complication, the be-

were satisfactory, and the preparation seemed to me worthy of confidence and of more extensive trials.

beerine, not succeeding, was omitted, and antimony successfully substituted; in the fourth it failed. Shortly after the *muriate of narcotine* was brought to notice by Dr. O'Shaughnessy it was fully tried by Dr. McLennan in the Native General Hospital, and by myself in the European General Hospital at Bombay, with unsuccessful results.

A strong infusion of *chiretta*, and scruple doses of the fruit of the *Cæsalpinia Bonduccella*, have also been used by me in the treatment of this disease, but I feel no certainty in respect to their efficacy.

I am aware that others have rated these several remedies more highly, but in judging of their usefulness we ought to recollect the tendency of the disease, in a large proportion of cases, to terminate spontaneously after a time. This feature is best marked in the mild quotidiens of the commencement of the rainy season in those climates in which the rainfall is not great. Moreover, it should be borne in mind that our treatment has been comparatively of little avail if several paroxysms have been permitted to recur; for each paroxysm is a step towards that cachexia the induction of which is the main evil of intermittent fever.

The means of removing this cachectic condition, when once formed, or of preventing its full development when it threatens, will be more conveniently noticed in connexion with the consideration of intermittent fever complicated with splenic enlargement.

The three following cases will illustrate the treatment of simple intermittent fever in the manner which has now been recommended :—

1. *Simple Intermittent Fever treated with Quinine.*

Antone Fernand, of fifty-four years of age, and of spare habit, a native of Goa, and following the occupation of a cook,

was, in July, 1851, the subject for four successive days of attacks of fever, coming on with chills at one P.M., and terminating with sweating at three P.M. He was admitted into hospital on the 16th during the presence of the fifth paroxysm. On the following morning there was intermission, and four-grain doses of quinine were given every second hour for four times. There was a very slight accession on that day at six P.M., but none afterwards. The only treatment consisted in repeating the quinine on the 18th and 19th, and giving it in smaller doses on the 20th. He was discharged well on the 21st. He admitted that his habits were intemperate, and said that he had not previously suffered from fever.

2. *Simple Intermittent Fever treated with Quinine.*

Callisam, a Hindoo of thirty-four years of age, of stout frame, and serving as a peon in the dockyard at Bombay, of temperate habits. He had been employed in the dockyard seven months, but his duties required his presence in the day-time only. He had never suffered from previous attacks of fever. In July, 1851, he became affected with quotidian intermittent. The paroxysm came on at half-past four with chills, and left him with sweating at nine P.M. He was admitted into hospital on the 26th of July, in the cold stage of the fourth paroxysm, the course of which followed that of the three preceding ones. On the morning of the 27th he was ordered to take five-grain doses of quinine every second hour for four times, and every third hour for two. There was no recurrence. The quinine was repeated in four-grain doses on the 28th. He was discharged at his desire on the 29th. No other medicine was given.

3. *Simple Intermittent Fever treated with Quinine.*

Maddoo Runney, a Maratha, of twenty-five years of age, in good condition, occasionally drinking spirits, but not using opium or bhang, serving for four years as a peon in the dockyard, and the subject of intermittent fever on former occasions, and affected for two or three months with hydrocele. In the month of August, 1851, this individual was attacked with quotidian intermittent. The paroxysm commenced at ten A.M. with chills, and terminated at midnight with sweating. He attributed the attacks to pain of the hydrocele. He was admitted into hospital on the 9th of August about the termination of the fifth paroxysm. On the morning of the 10th four grains of quinine were given at an early hour; but at the

visiting hour, half-past seven A.M., he was chilly, with occasional distinct rigors. Twenty-five minims of tincture of opium were given, and diaphoretic mixture ordered for the hot stage, and six grains of quinine to be given early on the 11th. The paroxysm of the 10th was as severe as any of the preceding ones, and it was the last. Thirty-six grains of quinine were taken on the 11th without causing giddiness or deafness or ringing in the ears. On the 12th the quinine was given in four-grain doses, to the extent of sixteen grains. On the 13th and 14th, in three-grain doses, to the extent of twelve grains. On the 15th it was omitted, and an infusion of chiretta, three times daily, was substituted. No other medicines were used, and no attention was paid to the hydrocele till the 17th, when it was tapped and injected with iodine. No febrile disturbance followed the operation, but it led to his detention some days longer in the hospital, and his transference from the Medical Clinical Ward.

In these cases* neither mercurial alteratives nor aperients were used, because the tongue was not much coated and the bowels were regular. Had it been otherwise, then a very moderate use of these means might have been indicated. To contrast with these cases, I shall now quote four treated by myself in 1829 and early part of 1830, at the commencement of my service in India, when inexperience left me no resource but to apply the principles of treatment at that time generally received and acted upon.

4. *Simple Intermittent Fever treated with Mercury.*

Chundadeen Lahoar, a sepoy of the 5th Company of the 14th Regiment of Native Infantry, stationed at Vingorla †, of

* I have not quoted any cases of Europeans from the General Hospital, because the diaries are not at present open to my reference. In the year 1843, when I wrote a Report on the fevers of that hospital during the five years that I had served in it, and which is published in the Transactions of the Bombay Medical and Physical Society, the diaries were before me, and their careful scrutiny led me to lay down in that paper the same principles of treatment which I now advocate.

† In the Southern Concan, and a healthy locality.

about thirty years of age, was admitted into the Regimental Hospital on the 5th of December, 1829, affected with paroxysmal attacks of fever. Calomel and antimonial powder, with purgatives, were given. On the evening of the 6th there was a slight febrile accession, and on the morning of the 7th calomel one grain and antimonial powder three grains were ordered to be taken thrice. There was no fever on the 7th, and on the morning of the 8th the gums were a good deal affected. The calomel was omitted and the antimony continued. At night of the 8th fever returned, and a purgative was given on the morning of the 9th, and the antimony was continued. There was heat of skin during the day of the 9th, and it was still present on the morning of the 10th. There were no local symptoms. The mouth was a good deal affected. The pulse was full and rather sharp. He was bled to twelve ounces, and ordered a quarter of a grain of tartarized antimony every third hour. Some Dover's powder was given at bedtime. He sweated during the night, and took some sulphate of magnesia and bitartrate of potash on the morning of the 11th. From this time there was no return of fever. He was ordered two ounces of infusion of cinchona thrice daily on the 12th. The mouth continued sore till the 17th. He was discharged on the 23rd. This patient was re-admitted on the 1st February, 1830, complaining of quartan accessions of fever. The attacks gradually yielded to an infusion of bark on the days of intermission, and six half-drachm doses of the powder on the day of expected paroxysm.*

5. *Simple Intermittent Fever treated with Mercury.*

Dhurnack Bicknack Naique, 4th Company, 14th Regiment, forty-eight years of age, was admitted into the Regimental Hospital at Vingorla on the 21st of November, 1829. He had suffered from an accession of fever the previous night, and on the nights of the 22nd, 23rd, and 24th it recurred, commencing with rigors, and terminating with sweating. The tongue was nearly clean. Calomel, two grains, pulvis antimonialis four grains, were given thrice daily, with occasional purgatives. On the 25th the gums were slightly affected. On that and the two succeeding days the fever recurred, but less in degree, and the calomel was omitted. On the 28th, 29th, and 30th the

* Thus early in practice in India, I became aware that mercurial influence had no febrifuge action. This erroneous opinion I shall have to discuss when treating of remittent fever.

febrile accessions returned with greater severity. The tongue became furred and dryish; and there was epigastric uneasiness. The calomel and antimonial powders were resumed, and the mouth was slightly sore on the 3rd. Leeches were applied to the epigastrium, and the bowels were freely acted on. He now took decoction of cinchona; and there was no return of fever till the 11th December, when it recurred, and was repeated on the two successive days. He had become emaciated; and continued in hospital till the 24th January, taking decoction of cinchona, or infusion of chiretta, or one and a half grain doses of quinine thrice daily.

6. *Simple Intermittent Fever treated with Mercury.*

Bricklavor Coonbie, Sepoy, 6th Company, 14th Regiment, admitted January 16th, 1830, twenty-five years of age. He had suffered for two or three days previously from daily accessions of fever. On the 16th, 17th, and 18th, there were recurrences in the afternoon. The tongue was white; the stomach irritable. He was treated with eight, five, and four grain doses of calomel at bed time; on two occasions in combination with antimonial powder; on one with compound extract of colocynth, and a purgative was given on the following mornings. On the 17th, he had also two-grain doses of calomel thrice. On the 19th, the gums were slightly affected. He complained of pain of the back of the neck, occasional head-ache, and seemed languid; and a blister was applied to the nucha. He had slight fever that day; but none afterwards. No more calomel was given; but the gums were more affected on the 21st. He now took infusion of chiretta and two or three doses of castor oil; and was discharged on the 28th.

7. *Simple Intermittent Fever treated with Mercury.*

An officer of the 14th Regiment, twenty-five years of age, about the date of February 19th, 1830, had been snipe-shooting in marshy ground, came home wet, and did not change his clothes. On the 22d, he was obliged to attend a court-martial all day; and there he was affected with fever. He took calomel and antimonial powder at bed-time, and the following morning a cathartic draught. On the 23rd, he felt pretty well, and attended parade. On the 24th, he had a severe paroxysm commencing in the forenoon; it lasted five hours. He was treated with solution of sulphate of magnesia and tartarized antimony, which caused vomiting and purging. He took calomel two grains, antimonial powder three grains;

and was directed to continue it thrice on the following day. On the 25th, no paroxysm. On the 26th, it commenced two hours earlier, and lasted through the greater part of the day. The pills of calomel and antimony were continued, and twelve leeches* were applied to the head. On the 27th, no fever. The pills were continued, and a scruple of powder of cinchona given twice, and a few grains of quinine very early in the morning of the 28th; but fever came on at four A.M. without shivering, and terminated with sweating about ten A.M. On the 1st March there was no fever; the gums were affected, and pyalism was present. He took three doses of quinine two and a half grains each. There was no return of fever: there was a good deal of pyalism on the 2nd. The mouth was well on the 7th, and he was convalescent.

The comparison of these two sets of cases seems to me very instructive. In the three first, the principle of treatment was, by efficient means, used in the intermission, to prevent the recurrence of the fever. In the four† cases of the second set, this principle was almost altogether neglected, and attention was chiefly directed to lessening the excitement of the hot stage by evacuants and remedies that deteriorate the blood. But it may be urged that, in both sets, recovery took place. True; but what difference in the steps towards, and the character of, that recovery. Intermittent fever is, as already remarked, a disease which rarely of itself causes death. The evil of it consists in that, if not speedily checked, it deteriorates the constitution, and makes it very predisposed to many diseases, which lead to much mortality.

In the three first cases the recurrences were at once prevented, and the patients left the hospital in three or

* The leeches at Vingorla were of large size.

† These cases are a subdued picture, rather than otherwise, of the treatment then followed. It was common then, and for many years afterwards, for officers to provide themselves with what were called fever pills, viz., a combination of calomel and antimonial powder.

four days uninjured by the fever, or by the unindicated use of evacuant or blood-deteriorating remedies. In the four last cases, on the other hand, the fever recurred from day to day; and its debilitating and blood-deteriorating influence was augmented by evacuations and by mercury; and the patients left the Hospital after lingering for weeks in it, still enfeebled, and unfit for immediate duty.

SECTION III.

INTERMITTENT FEVER COMPLICATED WITH ENLARGEMENT OF THE SPLEEN. — SYMPTOMS. — PATHOLOGY. — TREATMENT.

SYMPTOMS. — Enlargement of the spleen is by far the most frequent complication of intermittent fever.* It does not occur, however, for the most part, in connexion with first attacks, but generally after several recurrences either of the quotidian or the tertian type. But if the first attack has been inadequately treated, and the paroxysm has been permitted several times to return from the insufficient use of antiperiodic remedies, then, even with it, we may look for the not unfrequent occurrence of splenic enlargement.

This condition of the spleen is always associated with a more or less cachectic state of the system; a state in which we may believe the blood to be deficient in its proportion of organic solids, and in which these solids are also, in every probability, deteriorated in quality.

* As evidence of its frequency I find that out of 243 clinical cases of intermittent fever, enlargement of the spleen was present in ninety-one. It is unnecessary to collect further proofs of so familiar a fact.

A smoky-coloured appearance of the conjunctivæ of the eyes will be frequently observed in association with this state of system and condition of the spleen, and may, with the pallid tongue, serve to excite our suspicion and to direct our inquiries. When I speak, however, of enlargement of the spleen, I do not confine myself to those cases in which the enlarged organ is to be felt projecting below the margin of the left false ribs. In many instances, when the enlargement has not attained this degree, its existence may be readily determined by careful percussion. Dulness may be found to be present from the seventh or eighth rib downwards to, but not beyond, the costal margin, and inwards as far as a vertical line from the anterior fold of the axilla. Enlargement of the spleen, then, may range from that degree which can only be determined by percussion of the walls of the chest, to that which leads to the presence of abdominal tumour reaching to the crest of the os ilium and inwards beyond the mesial line.*

The coexistence of systolic cardiac murmur with enlargement of the spleen is occasionally observed; and when this takes place without any other physical sign of cardiac disease, there can be no hesitation in relating

* I have frequently observed students fail in detecting enlargement of the spleen, even when it was to be felt below the margin of the ribs, from unskilful manipulation. The most certain mode of detecting a slight degree of projection of the spleen below the ribs, is to place (the patient being recumbent), the palmar surface of the fingers of the left hand closely, but without pressure, on the abdominal wall at the margin of the eighth, ninth, and tenth ribs, and then, with the right hand applied on the dorsal aspect of the last ribs and just below them, to jerk gently upwards in the direction of the left hand, on the fingers of which the edge of the spleen will be felt distinctly to impinge.

the murmur to the altered condition of the blood, which, we know, so generally attends an enlarged state of the spleen. But it is of importance further to be aware, that the enlargement of the spleen may cause abnormal præcordial dulness, and that, with this, cardiac murmur may be also associated. The abnormal præcordial dulness may be produced partly by displacement of the heart upwards, and partly by the enlarged spleen, preventing the free descent of the diaphragm, the full expansion of the lung, and, consequently, the complete overlapping of the left side and base of the heart by its thin edge.

The four following cases will illustrate this clinical observation. It is of importance to bear it in mind; for, on the first occasion on which my attention was called to it, I thought that the abnormal præcordial dulness, co-existing with a cardiac murmur, indicated the presence of heart disease:—

8. *Abnormal Præcordial Dulness from Enlarged Spleen.*

Abdoola Ibrahim, a Mussulman labourer, eighteen years of age, had for upwards of a year been the subject of frequent attacks of intermittent fever. He was admitted into hospital on the 23rd of June, 1851, enfeebled and reduced by disease. The spleen was much enlarged. A line drawn transversely from the cartilage of the left sixth rib to the vertebral column marked its upper limit. A curved line from the same cartilage to the umbilicus, and thence to about an inch above the crest of the ilium, marked the lower limit. The apex of the heart beat between the third and fourth ribs, and the præcordial dulness was confined to the third and fourth left costal cartilages and the interspace between the second and third; and at the outer lower limit was almost continuous with the splenic dulness.

9. *Abnormal Præcordial Dulness from Enlarged Spleen associated with Systolic Murmur.*

Hurreem Adamjee, twenty-three years of age, a Mussulman, native of Ahmedabad, and frequently suffering from intermit-

tent fever, was admitted into the Jamsetjee Jejeebhoy Hospital on the 9th August, 1852. He was pale and anæmic. The spleen was very much enlarged, extending downwards almost to the crest of the ilium, internally beyond the umbilicus and its upper limit, as indicated by percussion, reached to the sixth left intercostal space. The præcordial dulness commenced at the left second intercostal space, and became continuous with the splenic dulness. At the level of the third intercostal cartilage it reached transversely from the middle of the sternum almost to the nipple. The apex beat between the fourth and fifth ribs internal to the nipple. A faint, but distinct systolic murmur was heard at the left second intercostal space, close to the sternum, but was not audible at the apex, where the sounds of the heart were both distinct. There was no increased impulse. A distinct venous murmur was heard at the junction of the jugular and subclavian veins of the left side.

10. *Abnormal Præcordial Dulness from Splenic Enlargement. — Systolic Murmur present.*

Abdul Cadur, fifteen years of age, a Mussulman peon, and the subject of quotidian intermittent fever for thirteen days before admission into hospital on the 16th July, 1851. The spleen was not felt below the ribs; but, as ascertained by percussion, its upper limit was as high as the eighth rib, and its internal one was a vertical line half an inch external to the nipple. Præcordial dulness extended from the third to the fifth rib, and between the nipple and the sternum. There was a distinct systolic murmur; but not louder at the base than at the apex of the heart. On the 2nd August, the internal limit of the splenic dulness was a vertical line an inch external to the nipple. The upper limit was unchanged. The upper limit of the præcordial dulness was the upper margin of the fourth costal cartilage. The cardiac murmur was disappearing.

11. *Abnormal Præcordial Dulness from Enlargement of the Spleen. — Systolic Murmur present.*

Francisco Antonio, twenty years of age, an inhabitant of Lisbon, of stout and well-proportioned frame, the subject of tertian intermittent fever for fifteen days, was admitted into hospital on the 25th July, 1851. The pulse was of moderate volume, and somewhat jerking. The indurated edge of the spleen was felt below the margin of the left ribs. Its upper limit was the ninth rib; its internal limit a vertical line about an inch external to the nipple. The præcordial dulness extended from

the lower border of the third rib to the lower border of the fifth rib, and occupied the transverse line from about half an inch internal to the nipple. There was a distinct systolic aortic murmur. The recurrences of fever were prevented; and on the 2d August, the internal limit of the splenic dulness was a vertical line from the posterior fold of the axilla. The upper limit of the præcordial dulness was the interspace between the third and fourth ribs; and the external limit was a vertical line an inch internal to the nipple. The systolic murmur had altogether disappeared.

These cases, and it would be easy to add to their number, will serve to put us on our guard against concluding that disease of the heart is necessarily present when abnormal præcordial dulness, with or without cardiac murmur, is associated with enlargement of the spleen. I have attributed the abnormal præcordial dulness to the mechanical influence of the enlarged spleen on the heart, and the expansion of the lungs. But there is more than this. I believe that we may have the same phenomena as regards the heart, in very anæmic states, uncomplicated with splenic enlargement; and that incomplete lung expansion, consequent on limited respiratory function, a necessary concomitant of much anæmia, is, in such cases, the cause of the abnormal præcordial dulness. The condition of the blood in this, as well as in that complicated with splenic enlargement, is of course the explanation of the cardiac, arterial, and venous murmurs.

The following case seems to me an illustration of the statement I have just made.*

* Since these observations were written, I have had the advantage of referring to Dr. Sibson's very valuable and instructive work on Medical Anatomy. In the first fasciculus this extension of præcordial dulness, by shrinking of the lungs, is pointed out. I leave the text as originally written, for I find nothing at variance with it in Dr. Sibson's remarks.

12. *Extended Præcordial Dulness, with Systolic and Venous Murmurs, without Splenic Enlargement from Anæmia alone.*

Antonio Domingo, aged fifteen, a native of Goa, and following the occupation of a shepherd. Had been out of health for some months, suffering from palpitation, præcordial uneasiness, occasional dry cough, œdematous feet, and febrile accessions coming on towards evening, without distinct chills. He had never suffered from rheumatism. He was admitted into hospital on the 1st January, 1854, presenting a very anæmic appearance. The pulse was small, jerking, and somewhat frequent. The præcordial dulness was bounded superiorly by the third rib, internally by the median line, and externally by a vertical line drawn a quarter of an inch external to the nipple, and below by the sixth rib. A blowing systolic murmur was audible over the third left costal cartilage, increasing in the line of the aorta upwards, loudest at the top of the sternum, and decreasing in the direction of the apex, which beat in the intercostal space between the fifth and sixth ribs, an inch and a half below and half an inch external to the nipple. There was a venous murmur on the left side of the neck. The abdomen was slightly full. There was slight enlargement of the liver, as indicated by a distinct indurated edge felt below the right ribs. There was no enlargement of the spleen. He continued under treatment till the 15th February. During this time, the febrile accessions frequently returned. The urine was frequently examined; it was of low density, but gave no traces of albumen.

When discharged, he had lost much of his anæmic appearance. The jerking character of the pulse was no longer observed, and the cardiac and venous murmurs had almost ceased. The last note of the præcordial dulness was on the 15th January; and it gives, as the external limit, a vertical line drawn over the nipple.

Though, during the last month of treatment, the record, in this case, has overlooked the state of the præcordial dulness, still I feel pretty certain that it had notably lessened; for I well recollect making, as it subsequently seemed to me, an inaccurate diagnosis, founded on the abnormal præcordial dulness, without splenic

enlargement, and then correcting it, and making, in explanation to the clinical class, the statement with which I have just prefaced the narration of the case.

PATHOLOGY.—Our knowledge of the pathology of the spleen must bear relation to the uncertainties which still exist in respect to its physiology. But it forms no part of the province of the Clinical Physician to enter upon these speculative inquiries. Still, in respect both to the physiology and pathology of this organ, there are some truths, and some great probabilities, which we may safely acknowledge and apply to practice, and this with the more confidence, because they seem to be confirmed by clinical experience.

These I proceed to state :—

The large proportional capacity of the venous system of the spleen favours the presence of varying quantities of blood; and even if we disallow the existence of the lacunar circulation, on which Mr. Gray insists in his late researches*, we still have, in the thin limitary membrane of arterial and venous capillaries, a condition very favourable to the easy passage of the constituents of the blood from the course of the circulation into the pulpy parenchyma.

Without entering into the question of whether the spleen exercises a special influence or not in causing a degenerate state of the organic constituents of the blood, it is surely a very safe inference that blood once extravasated must lose the properties it had when circulating in the vessels, and have become unfit for serving the purposes of blood. Microscopic observation of the

* On the Structure and Uses of the Spleen. By Henry Gray, &c. London, 1854.

splenic pulp proves this to be the condition of the extra-vascular blood of which it is chiefly composed.

The degenerate blood of the splenic pulp, whether present in normal or in excessive degree, can only be removed from its position by the lymphatic system of the organ, or by re-entrance into the venous system. Microscopic observation of the blood in the splenic vein would seem to render it probable that some of it at least finds its way into the splenic venous blood, in the same degenerate form in which it exists in the pulp. When, either by direct transmission into the splenic vein, or indirectly through the lymphatic system, the material of the splenic pulp has, in some form or other, re-entered the circulation, it can only be eliminated from it by one, or other, or all of the emunctories of the body.

These statements, then, I think, are quite within the limits of true physiology, and now I would turn my attention to the pathology of the organ.

Enlargement of the spleen is, with few exceptions, met with only in individuals who have suffered from recurring attacks of intermittent or remittent fever, or who, not having suffered from distinct attacks of fever, have long resided in malarious localities. Under both circumstances, the splenic enlargement is accompanied by a cachectic state of the system,—a deteriorated condition of the blood.

The cold stage of intermittent fever, in which the blood tends from the surface of the body to internal parts, is favourable to its stagnation in such venous arrangements as those of the spleen, and the portal system of the liver; and when stagnating in the splenic capillary system, its passage, in excessive quantity, into the pulpy parenchyma, may be readily conceived. Under recurrences of the cold stage, a repetition of these events

takes place, and the bulk of the spleen necessarily increases.

The density of the enlarged spleen, as observed after death, will bear relation to the quantity and quality of the blood present at the time in the vascular system of the organ, as well as on the excess and the condition of the parenchymatous pulp; whether, for example, any of the fibrinous or albuminous constituent has become converted into tissue of low organization. When such conversion of the fibrine or albumen into tissue has taken place, then we may expect that some degree of enlargement will be permanent. But when it as yet depends on excess of blood in the vessels, or excess of unorganized spleen pulp, we may conclude that the organ may still be reducible to its normal condition by a gradual, it may be a slow, process of absorption and elimination.

And what effect is it probable that this accumulation of blood in the spleen, with its consequences, will have on the condition of the blood left circulating in the body? Repeated abstractions of blood from the purposes of the circulation, not immediately replaced by processes of assimilation, must, whether the blood escapes in hæmorrhages or other discharges, or accumulates in a spongy structure, as that of the spleen, have one effect on that which remains behind, viz., to reduce its proportion of corpuscles, perhaps its fibrine and albumen also; and to increase its proportion of watery constituent.

If enlargement of the spleen only occurred as a sequence of recurrences of intermittent fever, we might perhaps be satisfied with the statement just made of its relation to the altered condition of the blood, viz., that the enlargement is the antecedent, the altered blood the sequence.

But when we reflect that enlargement of the spleen and concomitant cachexia may take place from the influence of malaria alone, and without the intervention of fever, then we must, in the present state of our knowledge, fall back upon the belief that malaria exercises a direct deteriorating influence on the blood, and that this altered state of the blood favours its stagnation in structures adapted for this occurrence; that in some circumstances it is the chief, if not the single favouring condition, but that in others it only co-operates with the conditions of the cold stage of febrile recurrences. We shall the more readily be disposed to assent to this view of the deteriorating influence of malaria on the blood, when we find that nothing so surely leads to removal of enlargement of the spleen, as the application of well-directed means for improving the processes of assimilation and the condition of the blood.

Laceration of the Spleen.—The facility with which laceration of the enlarged spleen takes place is important to recollect. Four interesting cases of this event, occurring from slight external injury, are recorded by Mr. Heddle*, in the First Volume of the Transactions of

* It is the duty of those who are engaged with progressive pursuits, to commemorate men whose example may be good for others. I cannot mention the name of a much valued friend, without desiring to preserve the following record, which many years ago, as secretary of the Medical and Physical Society at Bombay, it was my privilege to place in the pages of that Society's Transactions.

THE LATE MR. HEDDLE.

“ Since the publication of the last number of the Transactions, the Society has experienced the loss of the much valued associate whose name is prefixed to this paragraph.

“ Endowed with high proficiency in his immediate profession, Mr. Heddle also possessed extensive and well arranged information in History, Geography, Chemistry, Botany, Geology, and other branches

the Medical and Physical Society of Bombay. The following is the only instance which has come under my

of Natural History ;— and these great and varied acquirements, always applied with an admirable spirit of philanthropy to increase the comforts and advance the happiness of mankind, were borne by this true lover of science with a humility so sincere and unaffected, that it was only in the unguarded moments of friendly intercourse, that the full measure of his knowledge and the perfect unselfishness of his disposition were allowed to become apparent even to those who enjoyed the privilege of his private friendship.

“Though the only contribution made by Mr. Heddle to the Transactions of the Medical and Physical Society, titled ‘A Selection of Cases of Violent Death which have formed the Subjects of Investigation before the Coroner of Bombay,’* is an excellent and practical paper, it conveys a very inadequate idea of the extent of the Society’s obligations ;— and the Secretary would ill discharge a duty due to the memory of his much esteemed friend, and to the Society, did he not gladly avail himself of this opportunity of recording in these pages (what is unknown to others), that by numerous acts of cheerful and unobtrusive co-operation, and by advice always practical and judicious, and ever ready when solicited, Mr. Heddle’s influence on the proceedings of this Society was not unimportant and is now the subject of grateful and pleasing recollection.

“It was, however, as Secretary to the Geographical Society of Bombay and to the Agri-Horticultural Society of Western India, that Mr. Heddle enjoyed the fullest scope for the exercise of his talents ; and these Societies, in a spirit of just admiration, are engaged in erecting a suitable monument commemorative of the rare endowments and the high-minded integrity which adorned their late Secretary and reflected honour upon them.

“Such is the public testimony which has been borne to a life of usefulness and worth, cut short at the outset of a career of high promise ;— nor have the private friends of this lamented individual been slow to testify their sympathy for his estimable qualities, and his early fall, by erecting a monumental obelisk on that spot of the Mahabuleshwar Hills where the remains of their departed friend repose.

“Mr. Heddle arrived in Bombay, on the 6th December 1829, and died at Mahabuleshwar on the 6th March 1842. At different periods

* 1st Number of Transactions.

own observation, and in it there was no evidence of any injury having been sustained.

13. *Rupture of the Spleen.*

John Dungy, police constable, formerly a sailor, and reported to be of dissipated habits, was admitted into the General Hospital on the 1st February, 1840. It was stated that he had suffered from general pains, head-ache, and uneasiness of chest for three or four days. He was bled with relief on admission; but there remained uneasiness at the margin of the left ribs on full inspiration, and the breathing was a good deal oppressed. The breathing continued oppressed. On the 2nd February there was general fulness of the abdomen and suffusion of the eyes; towards evening there was pyrexia; and towards midnight the respiration became more oppressed, and he died.

Inspection. — *Head.* — There was an ounce and a half of serum at the base of the skull.

Chest. — The lungs were partially collapsed; and their anterior part emphysematous. There was no fluid in the chest.

Abdomen. — In the cavity of the abdomen there were four imperial pints of dark coloured blood, in part coagulated. The spleen was quite protected by the arch of the ribs: it was eight inches in its long and four in its transverse diameter, and was pale in colour. About the middle of its length and on its inner aspect there was a laceration which, commencing at the edge of the spleen, extended vertically in an oblique direction for about an inch and a half; in depth it was about one line into the substance of the spleen, and the edges of the laceration in their widest part were asunder about a quarter of an inch.

It appeared afterwards that this man had been playing hard at cricket for some days; the last time on the 30th January. There was no mark of any blow, nor was there any reason for supposing that he had received one.

of his service he filled with marked credit the appointments of Assistant Garrison Surgeon and Deputy Medical Storekeeper at the Presidency; Storekeeper of the European General Hospital, and Surgeon to the Coroner; Vaccinator, and in Medical charge of the Police Corps. Latterly Mr. Heddle officiated as Deputy Assay Master, and Acting Assay Master in the Mint, in which office he justly earned the confidence of the Government, and of that part of the community having transactions with that establishment."

ON THE TREATMENT OF SPLENIC ENLARGEMENT.

TREATMENT. — If we desired to regulate the treatment of this complication by applying the physiological and pathological truths or probabilities which have just been stated, we would, I think, enumerate the following indications: — 1. To prevent the recurrences of intermittent fever should they still continue to take place. 2. To remove the cachectic state, and improve the condition of the blood, by the use of all means which tend directly to this end, and by avoiding all measures which tend to induce asthenia, or still further to impoverish the blood.

I believe, that under the guidance of clinical experience alone, apart altogether from physiological and pathological doctrines, we are brought to exactly the same conclusions in respect to the therapeutic means which are beneficial or injurious in this affection. Let us now consider these.

First the question of *change of air* presents itself. In first or second attacks of simple intermittent fever in ordinary localities, while as yet no signs of cachexia appear, the question of change of air does not arise. We are satisfied with the effective exercise of the medicinal means at our command, and which are quite adequate to the cure of the attack. This remark, however, is not intended to apply to the often beneficial step of removal from a worse to a better room in a house, or from a worse to a better house in the locality of the attack, directed on ordinary hygienic principles, and carried into effect during the period of intermission.

When, however, an abiding malarious influence begins to be developed, as shown by the frequent recurrences of fever, an enlarging spleen and an increasing debility,

then the question of change to a temperate and non-malarious climate becomes an important consideration. In the event of such measure being practicable, we must decide on the particular place under the guidance of general principles. We must bear particularly in mind, that the cachectic from malarious influence are, in proportion to the degree of the cachexia, susceptible of febrile recurrences and of internal inflammations and congestions, particularly diarrhœa or dysentery, under the application of external cold to the surface of the body. We must, therefore, acquaint ourselves with the thermometric range, the direction and force of the winds, the state of atmospheric moisture, and the different seasons of the climate to which we propose sending our patient. And above all, we must have assurance of the absence of malarious generation.

It would be foreign to my present purpose to instance particular localities, even if the information which I possess permitted me to attempt it. It is sufficient to state general principles for our guidance. Yet there is one country to which in several instances under my immediate observation change of air has been had recourse to in these circumstances with so much disadvantage, that I feel myself justified in entering a caution against it: I allude to change from India to Egypt in the winter season, and Syria in the summer and autumn.

In the year 1840, a medical officer of feeble constitution, who had suffered from malarious fever in Guzerat, Bombay, and the Deccan, left Bombay on my recommendation in the month of February for Egypt. At Cairo, from the influence of the Kamsin wind, he suffered from congestion of the head and lungs; was attacked with remittent fever at Alexandria; and again, in the month of May, at Smyrna; and again at Constantinople, where

the attack proved fatal. Since the occurrence of this case, I have become, from the personal communication of the sufferers, acquainted with four others, in which obstinate malarious fever was acquired in Egypt or Syria; and it is a curious circumstance that the febrile paroxysm was in two of them attended with severe strangury.

In confirmed malarious cachexia change of air from the locality in which it has been acquired to one more suitable may be looked upon as a measure essential to complete recovery; and there should be no hesitation in strongly recommending it in all practicable cases. At the same time, however, whether the change has been had recourse to, or has been impracticable, or the degree of derangement has been such as not to render it necessary, we must adopt those means of medical treatment which are most efficacious in improving the state of the system, and lessening the enlargement of the spleen.

If the fever continues to recur, it must be prevented by the adequate exhibition of quinine in the manner advised in the treatment of simple intermittents. When this has been effected, we shall find, as is well known, that the cachectic state is most surely lessened by the continued use for some time of the preparations of iron in moderate doses. Those which I have generally used are the sulphate of iron in combination with small doses of quinine, the tincture of the sesquichloride and the solution of the persesquinitrate. These means at the same time are the most effective in reducing the bulk of the spleen. Improvement of the general system and decrease of the splenic enlargement progress together, and this without the adoption of any special local means. Due attention must at the same time be given to all other measures that conduce to the preservation

of health and to its restoration when deranged, as the regulation without too much active interference of the excretions, and of a diet suited to the condition of the digestive organs and the assimilating powers. The state of the mind should also be considered, and its cheerful occupation in as far as practicable be provided for.

The question now arises, may we not observe the course of treatment recommended by Mr. Twining*, and aim at reducing the enlarged spleen by the application of leeches from time to time, and the daily use of moderate purgatives, combined with tonics? I have frequently used these means, and my conclusions are unfavourable to both. They are means which tend to induce asthenia, and still further to impoverish the blood. If the physiological and pathological remarks made at the commencement of the subject be correct, they are contra-indicated in theory, and observation in practice has led me to the same conclusion.

It may be admitted that the tendency of a purgative action, by deriving to the intestinal capillaries, is to lessen the amount of blood flowing in the splenic artery, and by freeing the circulation in the portal vein to favour that in the splenic vein, and thus decrease the bulk of the spleen; therefore, in occasional cases, in individuals in whom the powers of the system are not much reduced, the use of purgatives may be attended with benefit. But in the cachectic state of constitution which usually attends enlargement of the spleen, it is otherwise. Purgatives are then inapplicable, not only because the discharges tend to increase the cachexia, but for another and more evident reason, which I now proceed to state. It has been with me throughout these

* Clinical Illustrations of the most important Diseases of Bengal, Vol. i., 2nd edition.

remarks a leading aim to inculcate the fact, that a proclivity to dysenteric attacks is induced by malarious cachexia. They are generally excited by external cold, but very readily also by intestinal irritants — purgative medicines. It was the observation of this fact that led me to abandon the purgative treatment of splenic enlargement. The following are illustrative cases:—

14. *Splenic Enlargement treated with Purgatives —
Dysentery caused.*

A Mussulman groom, of thirty-five years of age, in tolerable condition, was, after twenty days' illness from quotidian fever, admitted into hospital on the 26th September, 1848. He had been the subject of enlarged spleen for about twelve months, following fever in Bengal, from which he had suffered for about eight months. On admission, the spleen extended below the level of the umbilicus, and reached almost to the mesial line. The febrile accessions were treated with quinine. The enlarged spleen, with purgatives, as Twining's spleen* mixture, the compound powder of jalap, or extract of colocynth, combined with sulphate of iron. On the 9th October, dysenteric symptoms were complained of; and, to the removal of these, the future treatment was directed. On his discharge, on the 16th, the enlargement of the spleen was considerably less. There had been no recurrence of fever since the 10th.

15. *Dysentery caused by Purgatives in the Treatment
of enlarged Spleen.*

Jacob Rahiman, a Bagdad Jew, of twenty-five years of age, following the occupation of a cook, was admitted into the hospital on the 13th December, 1848. He was not much reduced. He had arrived at Bombay from Bagdad the previous day; and, during the voyage, had been exposed to cold, and had suffered from irregular febrile accessions. He had for five years been the subject of splenic enlargement; and, on admission, the organ extended to the crest of the ilium, and to an inch to the left of the umbilicus; and there was dulness also below the margin of the right ribs. The febrile accessions

* A combination of jalap, rhubarb, bitartrate of potass, calumba root, ginger, sulphate of iron, tincture of senna, and peppermint water.

were treated with quinine, and the enlargement of the spleen with purgatives, as the compound jalap powder, spleen mixture, compound rhubarb pill, and one application of leeches. The febrile accessions ceased to recur after the 16th, and the spleen was reducing in size. On the 28th, dysenteric symptoms were complained of; and the febrile accessions recommenced with increased severity. The treatment was now directed to the dysentery. There was no return of fever after the 30th. The bowels were well on the 8th January; and he was discharged on the 10th with the spleen very much lessened.

16. *Enlarged Spleen treated with Purgatives, and Dysentery resulting.*

Esop Dien, a Mussulman, a native of Calcutta, of thirty-six years of age, journeying on a pilgrimage to Mecca, from Calcutta to Bombay, became affected with tertian intermittent, which recurred from time to time. Was admitted in tolerable condition into hospital on the 19th December, 1850, about seven months from the date of the commencement of the fever. The spleen reached nearly to the umbilicus. There was no recurrence of fever after the 20th. The splenic enlargement was treated with spleen mixture. On the 27th, diarrhoea was present, passing in a few days into dysentery; and was treated with leeches for abdominal tenderness, and ipecacuanha and opium. He was discharged well of the dysentery on the 8th January; and with the spleen considerably reduced.

In these three cases, though dysenteric symptoms were caused by the irritant action of the purgatives, the enlargement of the spleen was considerably reduced, and it might be argued that this was the effect of the purgative treatment. This, however, would be an erroneous explanation. In all the cases febrile accessions recurred at the time of admission; in all they were checked, and it was doubtless in consequence of this that reduction in the size of the spleen took place.

Now it may be inquired whether, in the treatment of enlarged spleen, deobstruent remedies may not be given with good effect. The internal use of preparations of

iodine and *bromine* has been had recourse to by many, and it is said with advantage. My experience does not enable me to speak with confidence on this point. In the treatment of the disease among the better classes of European society, after benefit has ceased to result from the measures already recommended, change of climate would be had recourse to as the most likely means to remove the disease. In hospital practice the patient is generally so perfectly satisfied with the improvement resulting to the general health and the enlarged spleen, by the use of quinine, preparations of iron, and general tonic management, that he is unwilling to continue longer under treatment. For these reasons the opportunity is not often afforded to the practitioner in India of testing the powers of iodine and bromine at the period appropriate for their use. I say appropriate for their use, for I should hold it to be a grievous error in practice to turn to the use of such remedies as iodine and bromine, to the neglect of that tonic principle of management, the efficacy of which is so manifest, and the theory of the action of which is so much in accordance with physiological and pathological views. When these have been fairly tried and enlargement still remains, then preparations of iodine and bromine may, with propriety, be had recourse to, if in the general state of the system or the condition of the digestive organs there be present no contra-indicating circumstance. It may be urged that the iodine or bromine may be given at the same time with the preparations of iron and the tonic management. The objection to this course is its inexpediency, for it is impossible to estimate justly the value of subsidiary means given at the same time with remedies of acknowledged efficacy. And nothing so mars the order and consistency of

therapeutic science as desultory and inconclusive experiments of this kind.*

But there yet remains one deobstruent remedy to notice — *Mercury*.

It is, I should hope, unnecessary to enlarge upon this topic at the present epoch of medical science. To Mr. Twining† we owe much for the clearness and force with which he has pointed out the evils which attend the use of mercurial preparations in enlargement of the spleen and its co-existing cachexia. He has dwelt upon the great susceptibility of the system to mercurial influence, and to the destructive effects of that influence when in operation. Clinical observation emphatically enforces this lesson, and theory most certainly confirms it. The changes effected in the blood by mercurial influence are probably not very different from those caused by the action of malaria; at all events, both are favourable to processes of degeneration and destruction of tissue, and unfavourable to processes of restoration and repair. To the unbiassed judgment it seems a strange idea to endeavour to correct the

* There is not anything in this statement, I apprehend, which can justify the conclusion that in the *present state* of medical science I am opposed to the occasional use of medicines on empiric principles. It cannot, I fear, be avoided; but it must be very evident, that if, while making such experiments, we at the same time use means of acknowledged power to effect the indication aimed at, the results of our experiment with the new remedy must be worthless and inconclusive. In respect to the use of iodine in splenic enlargement, I further quote the following observation extracted from my notebook. "A boy with enlarged spleen taking tincturæ ferri sesquichloridi twenty minims, with tincturæ iodinii compositæ ten minims, gums became tender and swollen, and slight pytalism occurred. Are these effects of iodine favoured by cachexia, as those of mercury are?"

† Clinical Illustrations of the most important Diseases of Bengal, 2nd edition, vol. i. p. 452.

evils of the one by the super-addition of the analogous evils of the other.

Mercurial remedies in enlargement of the spleen and its co-existing cachexia are distinctly and grievously injurious. They should never be used.

It remains to inquire whether there are not local appliances, which may be had recourse to in the treatment of splenic enlargement. To the application of leeches, I have already stated my objections: and means which cause vesication of the surface or pustular eruptions are clearly contra-indicated in a state of the system prone to take on processes of destructive ulceration or sloughing. Sinapisms may sometimes be used with advantage, when much uneasiness of the splenic region is complained of; but this does not often occur. I have used preparations of iodine externally, and also lotions of nitro-muriatic acid; but on their efficacy I am not prepared to decide, for they have been applied at the same time with the internal use of appropriate means. Having twice in the course of my remarks directed the attention of the reader to Mr. Twining's treatment of diseases of the spleen, I can hardly leave unnoticed his suggestion of passing long needles into the substance of this organ when enlarged. Of this proceeding I have no experience. Experiments of this kind always seem to me not to be in accordance with the spirit of a rational system of medicine.

Such, then, are the observations which I have to make on the management of this important complication of disease. It mainly resolves itself into improvement of the general system by change of air, appropriate tonic medicines and regimen, and the prevention of the febrile recurrences by the sufficient use of efficient anti-periodic remedies.

SECTION IV.

INTERMITTENT FEVER WITH HEPATIC COMPLICATION.—SYMPTOMS.—
PATHOLOGY.—TREATMENT.

THE co-existence of hepatic inflammation even with remittent fever, I found to be of rare occurrence in the European patients of the General Hospital at Bombay. In my published notes on intermittent fever in that institution, I have made no mention of the complication of hepatic enlargement; it must therefore necessarily have been rare, if it attracted my notice at all.

Of the 243 clinical cases of natives in the Jamsetjee Jejeebhoy Hospital, I find only eighteen in which complication of hepatic affection was observed; in six, it was considered to be inflammatory; in twelve, to be passive enlargement. I shall quote first a case of hepatic inflammation, and then one of hepatic enlargement.

The first is of interest, chiefly from the circumstance of death caused by cholera, giving the opportunity of observing the appearances presented by the liver. The absence of lymph exudations is probably an illustration of the remark made by Dr. Alison, that inflammation complicating idiopathic fever does not so readily pass on to its results, as when it is itself idiopathic. And this pathological observation justifies, I think, the caution which I would inculcate in the treatment of hepatitis complicating intermittent fever by induction of mercurial influence.

17. *Intermittent Fever complicated with Hepatitis—Death from Cholera—Liver in a state of vascular Turgescence.*

Mohedeen, a Mussulman sailor, of twenty years of age, a native of Cochin, and suffering there on two or three occasions

from febrile attacks. While on a voyage from the Persian Gulf, he was wrecked on the coast adjoining the island of Bombay, and consequent upon exposure to wet he became affected with fever, which, preceded by chilliness, recurred in irregular paroxysms, and, after seven or eight days of duration, was accompanied with pain of the right side of the chest. He was admitted into hospital on the 17th June, 1851, ten days after the commencement of his illness. There was pain of the right side of chest, increased by full inspiration and coughing; also pain below the margin of the right false rib, increased by pressure. There was some degree of yellowness of the conjunctivæ; but no perceptible induration or dulness below the margin of either ribs. The febrile accession recurred twice in the twenty-four hours. He was treated with four-grain doses of quinine during the intermission. Leeches were applied to the right side of chest and to the margin of the ribs, followed by a small blister on the former. Blue pill and ipecacuanha, with an occasional laxative, were also given. The fever did not return after the 19th. On the 20th, the pain below the margin of the right ribs was gone, and that of the chest very much lessened. In this state he continued till 1 a.m. of the 27th, when he was attacked with cholera, and died at 3 p.m.

Inspection twenty-two hours after death. — Both lungs collapsed freely, and were crepitating. The costal and pulmonary pleuræ of both sides were free of adhesions or traces of lymph exudation. They were healthy, with exception that the inferior-anterior part of the right costal pleura presented a slight blush of redness, which was not the case with the corresponding portion of the opposite side.

The heart was somewhat flabby; but its size and structure were healthy. The peritoneum was healthy. The liver was much congested, and bled freely when cut into. The stomach contained a small quantity of thin whitish fluid: its mucous membrane was pale. Peyer's glands in the ileum were slightly enlarged. The kidneys were flabby, but healthy in structure.

18. *Intermittent Fever with enlargement of the Liver.*

Saccaram, a Maratha labourer, of thirty-three years of age, addicted to the moderate use of spirits, was admitted into hospital on the 9th December, 1849. He was much emaciated; and had been, for four or five years, the subject of epigastric swelling, attributed to frequent attacks of fever. The irregular febrile accessions, generally preceded by chills, with increased epigastric fulness, for which he sought admission, had been

present five days. The hepatic dulness reached to within an inch of the umbilicus, and midway between the tenth rib and crest of the ilium. There was sense of uneasiness and weight rather than distinct pain. He remained under treatment till the 13th January. There was no return of fever after the day subsequent to that of his admission. The urine was free, generally of low density, and showing no traces of albumen. He was treated with quinine, the external application of a nitro-muriatic acid lotion, and latterly of an ointment containing iodine. He was discharged much improved in general health; but with little diminution of the size of the liver.

PATHOLOGY.—We must be careful not to confound enlargement of the liver, consequent upon intermittent fever or slow malarious influence, with that depending upon chronic inflammatory action.* The history of the case will be the chief guide to a correct diagnosis. It is very important to determine it, for the treatment of the two affections is very different.

The pathology of this hepatic enlargement is in character very similar to that of enlargement of the spleen. It may take place consequent on recurrences of the cold stage of intermittent fever, or it may result from a slow malarious influence without the intervention of febrile disturbance. We are justified, then, in concluding that, resembling the same condition of the spleen, it is caused by stagnation of blood in the venous system of the organ; it may be from the deteriorated state of the blood alone, or in combination with the consequences of the derangement of the circulation present in the cold stages of the paroxysm.

The proximate cause of the splenic enlargement was considered to be congestion of the vessels, addition to

* It can hardly be necessary to caution against the possible error of mistaking the enlargement of the liver from forming abscess, associated with hectic fever, for the enlargement of which we now speak, associated with malarious febrile accessions.

the spleen pulp, and addition to the fibrous connecting tissue by low organization of exuded fibrine and albumen. These three states, however, are not all necessarily present. The last is the one most frequently absent, and probably, indeed, is only met with in cases in which the enlargement is of old standing.

We may take the same view, of malarious hepatic enlargement, that there is blood stagnation in the portal and hepatic venous systems, addition to the contents of the hepatic cells, and exudation perhaps into the meshes in which the cells are placed. In cases of long standing we may further believe that addition is made to the connecting areolar tissue by low organization of exuded fibrine and albumen.

Microscopic investigation has as yet, so far as I know, been only very partially directed to the elucidation of this pathological state. I have myself no evidence of this kind to advance. The chief points which the microscope is calculated to determine are the degree and character of the additions made to the contents of the cells; and the fact of whether or not there is exuded matter deposited external to the cells; also, if so, its nature.

TREATMENT.—If there be much that is common between this state of the liver and splenic enlargement, then it is reasonable to conclude that the principles of treatment ought to be the same in both affections, though not necessarily carried out precisely by the same means. It may be reasonably hoped that so much of the enlargement as depends on stagnation of blood within the vessels, and excessive deposit in the cells, may be recovered from in time, by slow processes of absorption and elimination.

If febrile accessions are still recurring, then the first indication is to prevent them by the adequate exhibition of quinine. The next indication is to correct the deranged state of the system, and the deteriorated condition of the blood, by change of air from the malarious locality, cautious attention to the state of the excretions, not forgetting that of the skin, the use of small doses of quinine, of the mineral acids, and of extract of taraxacum. The diet should be carefully regulated with reference to the state of the digestive organs and the assimilating powers. The nitro-muriatic acid lotion or preparations of iodine may be externally used.

I have said nothing of the use of the preparations of iron, though in the allied affection of the spleen so much benefit was attributed to them. They have not been generally given. I have no experience of them, but they seem to me worthy of careful trial in small doses.

The question of the exhibition of purgatives has also to be considered, and in respect to this we must reason very much as we did of their use in splenic enlargement. It is true that derivation to the intestinal surface more directly and surely lessens stagnation in the vascular system of the liver than in that of the spleen, and that moderate purgatives may be used with advantage in the early stages of enlargement, while as yet there is little else than vascular congestion, and only commencing cachexia. But when the enlargement has been of some duration, and there is probably more than mere congestion, and when the cachectic state is fully developed, then we must be even more cautious than in the instance of splenic enlargement, for the proclivity to dysentery and diarrhœa is greater. Under these circumstances the indication is first materially to correct the cachexia, and having done so, then to have re-

course in addition to gentle aperient means. As regards the use of such deobstruents as iodine and bromine, I would apply the observations made of them in relation to splenic enlargement, but with the injunction of still greater caution and reserve. Lastly, in respect to mercury. That the milder preparations of mercury in small doses may be occasionally used with advantage to produce a gentle cholagogue action may be admitted. Much caution, however, must be observed, for the induction of mercurial influence is as injurious in malarious cachexia with co-existing hepatic enlargement as it is in the same state with co-existing splenic enlargement. The same train of reasoning is applicable to both. That mercury exercises an influence on the secreting function of the liver, which in the treatment of various forms of disease may be turned to good practical account, is very true. But that the induction of mercurial influence on the system has any action on structural changes of the tissues of the liver, different from that which it exercises upon the analogous tissues of other organs, is, according to my belief, altogether without foundation. It would not probably be difficult to show that a delusion (as it seems to me) of this kind has exercised a very injurious influence on the treatment of various forms of hepatic disease.

There is yet one other observation which I am desirous of making before concluding the subject of intermittent fever complicated with splenic or hepatic enlargement. The occurrence of gastric or intestinal hæmorrhage as a consequence of the enlargement of these organs, and of the co-existing cachexia, is in theory not an improbable event, and is, no doubt, an occasional one in reality. Yet these consequent hæmorrhages

must be rare. I cannot recollect an instance in my own experience.*

SECTION V.

INTERMITTENT FEVER COMPLICATED WITH JAUNDICE, OR AFFECTIONS OF THE STOMACH OR BOWELS.

Jaundice. — This complication is not common with the intermittent type of fever. Of 243 clinical cases, it is only recorded of three. Jaundice is, however, much more frequently observed in remittent fever, and will be treated of in detail in connection with that type.

Affection of the Stomach and Bowels. — It is not my intention to consider, under this head, those affections of the intestinal canal produced by ordinary exciting causes in constitutions broken down by frequent recurrences of intermittent fever, alluded to

* Mr. Twining's experience in Bengal on this point was different: he says: "During the existence of diseases of the spleen attended with much enlargement of the organ, hæmorrhages from the nose, lungs, or stomach, are very liable to occur." Dr. Graham reports a striking case of gastric hæmorrhage witnessed by him in the Native General Hospital in Bombay — the same field in which, for many years, my own observations have been made. (Transactions, Medical and Physical Society, Bombay, No. 5. p. 29.) In my notes of sick officers, I find a case reported by Dr. Don of an officer at Poona under his care in 1842. This officer had been affected with enlarged spleen for fifteen years. He died on the 14th April. On the 10th he vomited two pints of blood, and on the 11th a similar quantity, and on the 13th a pint and a half; on the day of his death there was also a recurrence of the hæmorrhage. It would be easy, no doubt, to add other cases to these, taken from different sources. Still the fact remains, that though the greater part of my service of twenty-five years has been passed in large European and Native Hospitals, I am unable to record a single instance observed by myself.

in my observations on the pathology of simple intermittents, and to be borne carefully in mind when we estimate the direct and indirect mortality resulting from malarious fever. Such affections will be more appropriately treated of in connection with the diseases of the stomach and bowels.

My present inquiry regards the complication of derangement of the stomach and bowels with recent attacks of intermittent fever.

In Europeans of good constitution this form of fever is very rarely attended with diarrhœa or dysentery; and when gastric symptoms, as frequent irritability of stomach, a tongue florid at the tip and edge, and some degree of epigastric uneasiness, are present, then we may suspect that there has been the habit of spirit drinking, or that the individual has been too much drugged with medicinal irritants. At a very early period of my practice—first with natives at Sassoor, and then with European soldiers of the 4th Light Dragoons at Kirkee—I became convinced of the fact that irritability of stomach was not unfrequently caused and kept up in quotidian fever by the unnecessary use of calomel and purgatives given during the hot stage.*

It is when intermittent fever occurs in individuals of asthenic constitution, from whatever cause the asthenia may have arisen, that we are apt to have complication of gastro-intestinal irritation. The proportion will bear some relation to the manner of treatment of intermittent fever in such states of constitution; for diarrhœa and dysentery are in these states very readily excited by the injudicious use of purgatives. Affection of the

* This question of practice is more important in reference to remittent fever, and under that head I shall have to return to it.

stomach or bowels was present in twenty-two of my 243 clinical cases; under the form of dysentery in eleven; diarrhœa in seven; gastric symptoms in one. To mark the relation of this complication to asthenic states, I have further to observe that, in seventeen of the cases, this state of constitution was present. A tongue with its characteristic florid edges and tip generally accompanies the stomach or bowel derangement; indeed, is not unfrequently present without these latter symptoms, serving to arouse our suspicions and to influence our treatment. Still, when this state of tongue persists with paroxysmal febrile phenomena in asthenic individuals unaccompanied with gastric irritability or increased intestinal discharges, we must be on our guard; for a similar state of the tongue not unfrequently presents itself in the same state of constitution in individuals affected with obscure inflammatory action of some important part, and consequent fever hectic in character. The practical rule deducible from clinical observation of this kind is to keep, in all asthenic cases, a most careful watch over all important organs; for their structures are very apt to be invaded obscurely by processes of degeneration and destruction. When diarrhœa co-exists with intermittent fever, we may occasionally observe a tendency in the febrile accessions to alternate with the diarrhœa; the one being present for three or four days, then ceasing, and being succeeded by the other. I have noticed this at Hyderabad in Scinde, as well as in the European General Hospital and the Jamsetjee Jejeebhoy Hospital at Bombay. It is, however, generally a feature of old fever cases, not recent ones. It was probably facts of this kind that led Sydenham to look upon dysentery as fever turned in upon the bowels.

TREATMENT. — In the treatment we must bear in mind the asthenic state of the system which is generally present, and use those means for correcting the gastro-intestinal derangement which will be stated in their appropriate place. But the important practical question which arises is, are we, in consequence of these complications, to abstain from the use of quinine during the intermission of fever.

I take the earliest opportunity of distinctly avowing my belief that it matters not what the complicating condition of an intermittent fever may be. The adequate exhibition of quinine during the period of intermission is always the ruling indication. Whatever the local derangement may be, it is sure to be aggravated during the season of febrile disturbance, and sure to be less in degree when that disturbance has decreased, or its recurrence has been prevented. I shall have often to assert this therapeutic principle, and to show that it is not only sound in theory, but also true in practice. Of all the complications of intermittent fever that can be named, irritation of the gastro-intestinal lining is that in respect to which the applicability of the principle just enunciated may be the most readily doubted. Whether quinine, applied to the mucous lining of the stomach or bowels, tends to be irritant in its action or not, I do not stop to inquire; for experience teaches me that the degree of this action, if it exists at all, is very much less than that which would accompany a recurrence of the febrile state.

On this point I quote the following illustrative case:—

19. *Intermittent Fever with Gastric Irritation treated with Quinine.*

Dowlut Sabajee, a Maratha labourer of twenty-nine years of age, frequently suffering from intermittent fever in his native

place, but free of it for a year past, during his residence in Bombay. He was admitted into the hospital on the 26th October, 1849. He was a good deal reduced in strength, and allowed that he indulged occasionally in the use of spirits. He had for eight days been suffering from daily accessions of intermittent fever, commencing with chills in the morning, and terminating with sweating towards evening. The febrile symptoms were accompanied with *frequent vomiting*, headache, soreness of limbs and slight cough, with tenderness of abdomen during the last three days. There was no diarrhœa on admission. The abdomen was retracted, resistent, and tender on pressure chiefly in the epigastric and left hypochondriac regions. The spleen was enlarged and reached nearly to the level of the umbilicus. The tongue was much coated, dryish, and rather florid at the tip and edges. The gums were spongy, and somewhat discoloured. The pulse was very feeble. The day subsequent to his admission was the single one of febrile recurrence. The only treatment used was the exhibition of quinine, first in four-grain doses in powder, repeated six times about the period of expected febrile accession, with intervals of two or three hours; then in five-grain doses in solution, with dilute sulphuric acid. The quinine was now gradually reduced to three and two grain doses given four times in the twenty-four hours, and latterly was combined with half a grain of sulphate of iron. The only other means used were the application of one sinapism to the abdomen, and effervescing draughts on the day that the quinine was exhibited in powder. Under this treatment there was no recurrence of fever or of vomiting. The tongue became gradually cleaner and moister, and lost its florid tip and edges, and the patient was discharged on the 12th November in much improved condition, and with the spleen so decreased that it could no longer be felt under the false ribs.

SECTION VI.

INTERMITTENT FEVER COMPLICATED WITH CEREBRAL AFFECTION.

SYMPTOMS AND PATHOLOGY.—In sthenic constitutions we may occasionally observe a train of head symptoms, as drowsiness, confusion of mind, suffusion of coun-

tenance, related rather to the cold stage, depending on congestion and followed by imperfect reaction. There may also, in the same state of constitution, during the hot stage, be present such degree of headache as to call for special treatment; but there is seldom, I think, any marked disturbance of the cerebral functions.

The first class of cases is merely a greater degree, as respects the head, of the kind of phenomena alluded to in my remarks on the cold stage of simple intermittents. The symptoms are apt to be misapprehended, and the treatment not well directed, as in the following case:—

* 20. A gentleman of stout habit, resident at Poona, on the 14th, 15th, and 16th July, 1837, suffered from pains of the limbs, lassitude, and furred tongue. On the 17th he experienced difficulty in articulating words, and numbness of the lower extremities. The countenance was suffused. He was bled and leeches freely. At noon on the 18th, 19th, and 20th, there was slight recurrence of the same symptoms followed by sweating. He was now sent to Bombay, and experienced there several febrile accessions ushered in with chills. In the treatment of this case quinine was very feebly given at Poona.*

In intermittent fever in asthenic states, more especially if there have been several recurrences, we may have in the hot stage, or towards its termination, some degree of delirium or incoherence. These symptoms, under such circumstances, are very generally indications of exhaustion, and are usually attended by other evidences of this condition: their true nature is not infrequently misunderstood, and serious errors in practice are in consequence committed.

* Though I did not see this patient, yet I was in the neighbourhood of Poona at the time, and know that at first the nature of the case was not rightly understood. Had it been so, there would have been less depletion and a freer exhibition of quinine. This gentleman is now (1855) in good health, and, I think, has never since been the subject of apoplectic threatenings.

But in intermittent fever we may also have head symptoms, related to organic lesion of the membranes of the brain. The two following cases are illustrative of this, and are moreover in other respects very instructive. They both show that though the head symptoms were really related to structural change, yet they were only present during the period of febrile accession, they were absent during the intermission. These cases are, therefore, confirmatory of the truth of that principle which attaches great importance to the prevention of the febrile recurrence as a means of improving a local complicating derangement.

The first also illustrates the occurrence of death by unexpected collapse at the close of a paroxysm, favoured in this instance by the injudicious use at that period of depletory means.

The second illustrates the curious fact that in intermittent fever, with local complication, we occasionally have at the usual period of accession, not the febrile phenomena, but only those indicative of the local derangement.

21. *Intermittent Fever, with chronic Meningitis.—Symptoms chiefly during Accession.—Death from unexpected Collapse.*

J. S., aged thirty-three, of stout habit, not long resident in Bombay, and latterly occupied in conducting an hotel, was admitted into the European General Hospital on the evening of the 24th September, 1840, at half past five P.M. It was stated that for the five or six previous days he had been affected with fever of the quotidian or tertian type, and had suffered from a paroxysm ushered in with rigors at noon on the day of admission. When seen he had pyrexia with slight wandering; tongue pretty clean, pulse frequent and feeble, abdomen supple. An effervescing draught was ordered every second hour for three or four doses, and twenty-four leeches were applied to the temples and cold cloths to the head. A

foot bath was directed to be used at bed time, and a draught, c. tinct. muriat. morphiæ one drachm, to be exhibited should the headache cease and there be no delirium. Was reported to have had no headache or wandering after the application of the leeches, and the skin to have become cool. The draught was given about half past ten P.M. He was reported to have got up to make water when he fell down convulsed. The head was immediately shaved, and a blister was applied to the nucha. He died at eleven P.M.

Inspection fifteen Hours after Death.—Body stout and loaded with fat. There were purple sugillations of the depending and posterior parts of the body.—*Head.* The sinuses and veins were turgid with blood, and there was a good deal of capillary vascularity of the pia mater over the entire convex surface of the brain. The arachnoid membrane was thickened and opaque, and in many places, chiefly at the dipping down between the hemispheres, there were patches and granules of lymph between the arachnoid and pia mater. The substance of the brain, when incised, showed numerous bloody points, but was tolerably firm in texture. There was an ounce of serum at the base of the skull, but not more than the usual quantity in the ventricles.—*Chest.* The lungs were healthy and very little congested. The cavities of the heart were moderately distended with blood. The inner lining of the aorta had a rosy tint, and there was commencing white deposit, in spots and streaks. The muscular parietes of the heart were healthy.—*Abdomen.* The intestines and omentum were loaded with fat. The former, distended with air, pushed the liver up to the level of the fourth rib. The mucous coat of the stomach had a dusky leaden tint, and was slightly more tender in texture than natural. The kidneys were healthy, and there was no distension of the bladder. The spleen was considerably enlarged. The liver was of a greyish tint when incised, but was natural in texture.

22. *Intermittent Fever: some of the Paroxysms complicated with convulsive fits, one of which terminated fatally.—Thickening and Opacity of the Arachnoid Membrane.*

Richard Parkman, aged 28, seaman, Honourable Company's receiving ship Hastings, after having been ill with intermittent fever for two or three days, was admitted into the General Hospital on the 24th March, 1842. On that day he ex-

perienced a febrile paroxysm attended with head-ache. An emetic was exhibited, and followed by repeated doses of quinine. On the 25th, there was neither fever nor head-ache. On the evening of the 26th, he was seized with a convulsive fit; but denied having been ever subject to such attacks. On the morning of the 27th he was free of fever or head-ache. Cold affusion to the head, with a hot foot-bath, were used twice; and the only complaint made that day was of a sense of constriction of the throat towards night. On the morning of the 28th, he was free of fever, and quinine was directed to be given. He had a convulsive fit in the course of the day, and again at night. On the morning of the 29th, he was free of complaint, and the skin and pulse were good. The liquor arsenicalis was directed to be given thrice, and cold affusion to be used to the head in the event of a recurrence of the fit. Towards evening there was a slight febrile accession, but he slept well; and, at the morning visit of the 30th, he was reported to have no head-ache, and to have had no return of the convulsions. The remedies used on the 29th were directed to be repeated. About half an hour after that report, he was seized with convulsions (reported to be not more severe than the former ones), and he died in about five minutes.

Inspection. — *Head.* On the upper surface of the brain there was a thin veil of serum between the arachnoid and pia mater. The former membrane was opaqueish in parts, with here and there deposit of distinct yellow points, but in no great number. The substance of the brain was healthy. There were about two ounces of serum at the base of the skull. — *Chest.* The right ventricle of the heart was distended with blood; but the other contents of the chest were in a healthy state. — *Abdomen.* Old adhesions bound the liver to the side. The viscera were otherwise healthy.

TREATMENT.—In those cases in which symptoms of cerebral congestion are related to the cold stage of the paroxysm, we must have recourse, during their presence, to such amount of general or local blood-letting as the state of the constitution and the pulse may seem to justify, and the urgency of the symptoms seem to demand. But we must not carry those measures to the same extent as might be necessary if the cerebral congestion were not dependent on the operation of a

transient influence. The application of warmth to the extremities and purgative remedies are also indicated. The important point of practice, however, in such cases is, by careful investigation, to satisfy ourselves of the nature of the affection, and to prevent, by the adequate exhibition of quinine, a recurrence of the symptoms. For it is a serious error to neglect this, and to rest satisfied with endeavouring to lessen the deranged cerebral action, when it occurs, by the repeated use of depletory means.

In those asthenic states alluded to, in which the nervous symptoms seem to depend on a state of exhaustion, the indication is to attend to suitable nourishment and stimulants, and to give quinine freely during the intermission. The restlessness and wandering may perhaps tempt us to exhibit a full opiate towards the close of the paroxysm. But the exhibition of this remedy under these circumstances is a dangerous proceeding. Case 21. illustrates its injurious action.

The important therapeutic question of the use of opiates in the treatment of malarious fever will receive full consideration when we come to treat of remittent fever.

SECTION VII.

INTERMITTENT FEVER COMPLICATED WITH BRONCHITIS, PNEUMONIA, RHEUMATISM, SCORBUTUS, PERICARDITIS, ASTHMA.

Bronchitis.—This complication is not of common occurrence in Europeans in India; but in natives, with the exception of splenic enlargement, it is more frequent than any other complication of which we have treated. The cause of the difference between Europeans and

natives in this respect is, I apprehend, of easy explanation. The former are usually much better protected from the influences of cold and wet.

The bronchitic complication in natives has been observed by me in the Deccan, in Scinde, and in the Jamsetjee Jejeebhoy Hospital at Bombay. It is common in Guzerat also, and I presume throughout India generally, in places and at seasons when the alternations of temperature are considerable, and rain-fall frequent, and winds chilling.

It is in the cold months of the year, December, January, and February, and in the months of June and July—those of commencing rain-fall, of much of the tract of country subject to the influence of the south-west monsoon—that this complication may be chiefly looked for.* It may be associated with the quotidians and tertians of those seasons; and, no doubt, we are liable occasionally to mistake bronchitic symptoms with ephemeral fever, for the affection now under consideration.

The presence of bronchitis is, of course, easily determined by symptoms and physical signs. The degree is usually slight, for if the bronchitis becomes extensive, the febrile phenomena will tend to assume a remittent form.

I have said that, after splenic enlargement, bronchitis, in some degree, is the most frequent complication of intermittent fever in natives. Of the 243 clinical cases to which I have already so frequently alluded bronchitis was present in 36.

TREATMENT.—I need hardly repeat that the indication of treatment in the intermission is the same in this as in all the other complications—to prevent a recurrence

* In districts subject only to the north-east monsoon, the latter half of October and November probably take the place of June and July.

of the febrile paroxysm. The bronchitis, however, must also be considered. The moderate use of tartarized-antimony, where no contra-indication exists, will in general suffice for its control; quarter grain doses may be given in combination with quinine during the intermission, and at other times also, if thought necessary.

I have said that ephemeral attacks of fever with bronchitis, evincing a periodic tendency, are sometimes mistaken for malarious intermittents; and we may be led to this conclusion by the result of treatment alone. We occasionally meet with cases, considered from the general character of the symptoms to be intermittents complicated with bronchitis, in which the usual efficacious treatment by quinine fails, and its abandonment and the substitution of a freer use of antimony are successful. Such, I apprehend, have not been true malarious intermittents, but rather instances of febrile and bronchitic phenomena excited by cold or wet in individuals in whom there lingers some slight degree of previous malarious influence, to which the intermittent character of the febrile symptoms may be attributed. Whether the explanation now given be just or not, the clinical observation is correct and useful to recollect.

Pneumonia.—Pneumonia is recorded as having been present in 5 of the 243 clinical cases of intermittent fever; but this complication is much more common in remittent fever, and will be considered in connexion with that type.

Rheumatism.—In 4 of the cases there was such degree of pain of joints present with the paroxysmal febrile symptoms as to justify the inference that some amount of rheumatic diathesis existed.

Scorbutus.—In 5 cases some degree of sponginess and discolouration of the gums indicated the presence of this diathesis. The febrile phenomena were associated with a greater amount of pain of the loins and limbs than is usual in intermittent fever. It is also to be observed that in this and allied forms of cachexia the febrile phenomena, though distinctly coming in accessions and followed by intermissions, are characterized by slighter degrees of excitement, and the distinction into stages is often inappreciable. Still, they are to be regarded as related to malarious influence, and as requiring the use of anti-periodics for their removal, while we at the same time endeavour, by all possible means, to correct the cachexia.

Pericarditis.—I quote the only instance of this complication which has come under my notice because it is very rare, and illustrates well the efficacy of that principle of treatment which embraces at the same time remedies for the inflammation and for the fever. The pericarditis was accompanied with some degree of pneumonia of the right lung.

23. *Intermittent Fever complicated with Pericarditis and Pneumonia.—Recovery.*

Joaquim Manoel, an African sailor, of stout habit, and twenty-two years of age, was admitted into hospital on the 19th September, 1851, after four days' illness, which, attributed to exposure to wet, commenced with febrile symptoms ushered in with chills, and followed by præcordial uneasiness. On the succeeding days intervening between that of attack and admission into hospital, the febrile paroxysm returned daily, with chills, at eleven A.M., and ceased, with sweating, at five P.M. When first seen, there was febrile excitement, with full pulse. The tongue was thinly coated, and was florid at the tip and edges. There was abnormal dulness and bronchial respiration in the right dorsal region. There was lancinating

pain in the præcordial region, increased by cough and full inspiration. The præcordial dulness was bounded above by the third left rib, below by the sixth, internally by the left margin of the sternum, and externally by a line perpendicular from the nipple. A rough murmur, obscuring both sounds, was heard generally over the præcordial region; but it was most distinct an inch internal to and a little above the nipple.

There was no induration or dulness below the margin of the false ribs of either side. He had never suffered from rheumatism. He indulged moderately in the use of spirits. Fifty leeches were applied to the præcordial region; and a pill of five grains of calomel, with ipecacuanha and opium, one grain each, was given. On the morning of the 2d, there was febrile intermission; the præcordial pain was much less; the murmur was not audible; and crepitus began to be heard in the right dorsal region. Quinine, in five-grain doses, was given in the usual way; a blister was applied to the præcordial region, and warm turpentine to the right dorsal region; and the pill was repeated at bed-time. From this time there was no recurrence of fever; and there was gradual amendment of the signs of pericardial and lung affection. The quinine was continued; the pill was repeated on the 21st; then discontinued. The quinine was subsequently given, in combination with Dover's powder. He was discharged on the 28th, when the præcordial dulness was bounded above by the fourth rib, below by the fifth, internally by the left sternal margin, and externally by a perpendicular line half an inch internal to the nipple. With exception of slight harshness of the first sound, nothing abnormal was heard. The dulness of the right dorsal region was nearly gone, and vesicular respiration was present. The urine was frequently examined. It was scanty at first; then became more abundant; the specific gravity ranged from 1019 to 1025; it gave no traces of albumen.

Asthma.—There was one instance of this complication, which I also quote.

24. *Intermittent Fever complicated with Asthma.*

Chitim, a Hindoo drummer, of thirty years of age, and of stout frame, a native of Golconda, had suffered for about eight months from intermittent fever and asthma, which was liable to return at intervals of fifteen days. He was admitted into hospital on the 2d August, 1850. The physical signs of emphysema of the lungs were present. The paroxysm of fever and

of dyspnœa recurred together at night, and ceased towards the morning. He was treated with quinine in four-grain doses, at first uncombined, then with sulphate of iron (one grain) and dilute sulphuric acid. No treatment, except rubefacients to the chest, was specially directed against the asthmatic symptoms. On the first and second day after admission, the fever and asthma were much less: they ceased on the 3rd day. He was discharged on the 8th August.

This case is interesting from its bearing on the clinical fact, that spasmodic asthma in India is occasionally most successfully treated with quinine and small doses of sulphate of iron given during the absence of the paroxysm. In such cases it is reasonable to infer that the asthmatic symptoms are related to malaria as a cause. So satisfied am I of the accuracy of this observation, that I hold it to be a very important part of the examination of asthmatic patients in India to determine the probability or not of a malarious influence. This may be effected by careful inquiry into the history of the patient and the condition of the spleen. If there be good reason for suspecting the presence of this influence, then we should treat the case with quinine and iron. We may moreover venture to give a more favourable prognosis than in asthma arising under other circumstances, provided an emphysematous condition of the lung is not present to a great extent.

CHAPTER II.

ON REMITTENT FEVER.

SECTION I.

THE DIAGNOSIS OF REMITTENT FEVER, FROM INTERMITTENT FEVER AND ARDENT CONTINUED FEVER. — DIVISION INTO SIMPLE AND COMPLICATED.

REMITTENT FEVER depends on the same causes as intermittent fever, but as there is present a greater degree of the derangements of function, which are characteristic of febrile disease, it may be assumed that this type will preponderate whenever the causes are most intense; or, when not intense, are operating upon individuals more predisposed. The evidence which justifies the conclusion that these two forms of fever originate from identical causes, and are merely different degrees of the same kind of derangement, is of the following nature:—

It is often observed that in the same locality, when the conditions of malaria generation are great, the remittent type of fever prevails; but that when these conditions lessen in degree, then the type becomes intermittent. It is not uncommon for cases of fever remittent at their commencement, to become intermittent before their close, or for cases that have been intermittent at the outset, to pass into the remittent type in their advanced stages. Instances are also not unfrequently met with, which seem to occupy an intermediate position, which by some would be classed as intermittents, by others as remittents,—cases in which there

is intermission as regards the true febrile phenomena, but in which the tongue continues coated, the secretions more or less deranged, and in which the succeeding paroxysm comes on gradually without distinct feeling of chilliness.

The essential difference between intermittent and remittent fever is, that in the former there is a more complete cessation—intermission of the phenomena of deranged action; while in the latter there is only abatement—remission of them.* In well-marked cases, the diagnosis of intermittent from remittent fever is very evident; and in respect to those transition ones, it is not of much practical importance under which head we class them, for it in no respect affects our principles of treatment.

The *ardent* continued form of fever occurring in some parts of India in the hot months of the year, chiefly in April and May, and presenting itself in its most aggravated form in robust Europeans recently arrived, favoured often by intemperance and fatigue, requires also to be distinguished from remittent fever.

We shall be assisted materially in this diagnosis, by bearing in mind whether the season is one generally free from malaria or not, and whether the thermometric range is high. Also, whether the affected individuals have been previously exposed to malarious influence or not. The character of the febrile disturbance likewise materially assists us in the diagnosis. We note whe-

* It may seem that this familiar fact is stated with needless distinctness; but in reality I have conversed with medical men in India, who, though some years resident, did not seem to me to realize in their minds this simple view of the relation of these two types of fever, and who seemed to regard the terms as almost synonymous in meaning.

ther reaction runs high, whether there is much cerebral or gastric complication, and whether there is absence or not of distinct remission.

If the attack be in a hot and non-malarious season, in a recently arrived European, and febrile excitement be great and continued, there need be no hesitation in determining the disease to be ardent continued fever, not malarious remittent. The diagnosis is important; for, as we shall afterwards find, the principles of treatment are different.

Unfortunately, however, in practice, the diagnosis is not generally of this simple nature. We may have high fever with cerebral and gastric disturbance in lately arrived sthenic intemperate Europeans, in the months of June, July, August, September, October, when in many parts of India there co-exist elevated temperature and the conditions of malarious generation; or we may have the fever in April or May (non-malarious months) in Europeans, or others, who having been subjected to previous malarious seasons, are still sthenic, perhaps intemperate, and frequently exposed to the sun. But the fever, if closely watched, will in both instances be found to be characterized by distinct, though perhaps short, remissions. The simplest and most practical view of this last, and in European troops at some stations in India not infrequent form of fever, is to consider it as compound in its nature, partly the product of malarious influence, partly that of elevated temperature conjoined with other ordinary causes, and both operating on sthenic constitutions. The principles of treatment will necessarily consist of a combination of those applicable to the unmixed continued and remittent forms.

I do not think that the occasional difficulty of the diagnosis of remittent and continued fever has been

here overstated. That excellent physician, Mr. Twining, to whose clinical lessons we owe so much in India, seems to me to have experienced this difficulty; for in his chapter on Continued Fevers, he has not only failed in making the subject clear, but some of his illustrative cases, judged from symptoms and the result of treatment, partake more of the character of remittent than of continued fever.

I have before me the Medical Reports from 1822 to 1826 of Her Majesty's 4th Light Dragoons*, while stationed in a very malarious locality, Kaira in Guzerat, immediately after their first arrival in India. In these reports there is the same want of clearness in drawing the diagnosis between these two forms of fever; or perhaps it may be expressed more correctly by saying, that there is a want of recognition of the combined influence of the two sets of causes.

Remittent fever may be divided into simple and complicated. In the first we have present derangement of different functions, not greater in degree than is included in our idea of the severer forms of that complex disorder to which we give the name fever. In the second, there is combined a local inflammation, or a greater than usual degree of some other kind of local derangement. It will be practical and convenient to treat of simple and complicated remittent fever under the general heads of Symptoms, Pathology, and Treatment.

* When attached to this regiment at Kirkee in the Deccan, in 1832, I had an opportunity of studying the records of the regiment, and subsequently, when secretary to the Medical and Physical Society, I obtained for that Society, through the courtesy of the surgeon of the regiment, the copy of the Reports now adverted to.

SECTION II.

SYMPTOMS OF REMITTENT FEVER. — ORDINARY, INFLAMMATORY, ADYNAMIC, CONGESTIVE, BADLY DEVELOPED, WITH UNEXPECTED COLLAPSE, WITH PECULIAR FEATURES. — ALSO COMPLICATED WITH CEREBRAL AFFECTION, IRRITABILITY OF STOMACH, JAUNDICE, BRONCHITIS, PNEUMONIA. — DIAGNOSIS FROM HECTIC AND SYMPTOMATIC FEVER.

SYMPTOMS. — The first accession of remittent fever is generally preceded by a distinct sense of chilliness, but not usually approaching in degree to the rigor which not unfrequently ushers in an accession of the intermittent type. To the chilliness succeed heat of skin, headache, flushing of the face, frequency of pulse, occasional vomiting, a tongue more or less coated, thirst, pain of the loins and limbs, secretions from the bowels more or less vitiated, more or less repressed, and urine scanty and high-coloured. These symptoms continue for a period of varying duration, and are then succeeded by a stage of abatement or remission. The pulse falls in frequency, but does not resume the natural standard. The headache, the pain of loins and limbs become less, but are not altogether removed. The temperature of the skin decreases, but does not fall to the normal degree; the skin also becomes softer; there may be even a little moisture about the head and trunk. The thirst decreases, the tongue becomes moister, but is still coated.

This remission of the febrile symptoms may continue for a period varying in different cases, or in different epidemics, and then the exacerbation recurs, sometimes, but this is rare, with commencing chilliness, as in the first accession. Most commonly, however, there is no sense of coldness, but a gradual increase of the febrile phenomena, till they attain again the acmé of the exacerbation.

tion. In intermittent fever we found differences in the duration of the paroxysm and of the intermission, and in the periods of accession. Something similar is observable in the duration and periods of the exacerbation and of the remission in remittent fever.

1st. There are cases in which the exacerbation comes on about noon and declines before midnight. The remission continues during the night, and till the noon of the following day, when the exacerbation again recurs.

2nd. The exacerbation comes on about midnight and continues during the night till morning, when the remission takes place, and remains present till night. It is not improbable that in these cases it will be frequently found that the exacerbation has become postponed from the influence of quinine: but on this point I do not speak with confidence.

3rd. The exacerbation comes on about noon, and is succeeded towards evening by a remission which continues till midnight. Then an exacerbation again takes place, to be followed by a morning remission. This variety is by no means uncommon, and indicates a severe form of the disease,—one in which the fever shows a tendency to become continued, and in which adynamic phenomena are most likely to arise.

4. It is sometimes observed that the exacerbation takes place at different hours on alternate days, being on one day earlier, on the other later. In this respect there is an analogy to the double tertian.

Such, then, are the varieties in regard to the duration and periods of exacerbation and remission which we may expect to meet with in this type of fever; but in a given case we are unable to anticipate which of them the disease will assume. Nay more, it is true

that the natural course of the disease may be changed by treatment, just as was found to obtain in intermittent fever.

In this uncertainty then, in regard to the periods of exacerbation and remission, it is always very necessary to ascertain by careful and frequent observation the peculiarities, in this respect, of each case. It will not, however, fail to be remarked that there is one feature common to all, — that the morning is the period when we are most certain of finding the remission.

These variations in the period of exacerbation and remission are not only observed in the ordinary form of simple remittent fever, the symptoms of which I have just been describing, but also in those other varieties which are about to be considered. These we shall find owe their peculiarities to an aggravated degree of the stage of exacerbation, or of that of the initiatory cold stage, or to a decreasing amount of remission and an increasing duration of the exacerbation. We shall further have to describe varieties which display a marked development of depression of vital actions — an adynamic state; also varieties marked by the complication of inflammation of important organs, or local derangement of other kind.

The description which has now been given of the symptoms of remittent fever, applies very well to the most common and tractable form of the disease as observed by me in the European General Hospital at Bombay.

The admissions in a great proportion of instances were of seamen *, more or less habituated to a tropical

* In some — and these, in some instances the worst cases — the fever was attributed to the malaria of the dockyard, a locality already alluded to by me.

At the time of my service in the European General Hospital,

climate, and who sought hospital relief, after having been ill three or four days. The description also applies

with the view of ascertaining to what extent the crews of ships undergoing repairs in the dockyard at Bombay were liable to be affected with fever, I obtained through the kindness of Captain Ross, the Master Attendant, a list of ships of all kinds received into the dockyard during the period (viz., from 1st July 1838 to 1st July 1843), to which my notes on fever in the European General Hospital have reference, with the date of docking and undocking each ship. The number of ships amounted to 170. This list I compared with the Hospital Register, and noted opposite to the name of each ship, the number of the crew admitted for fever into hospital, during the time the vessel was in dock. The following is the result. Of the steamer *Atalanta*, in dock from the 23rd October 1839 to the 19th February 1840, nine fever cases; of the private ship *Orleana*, in dock from 13th October to 11th November 1840, twelve; of the ship *Herefordshire*, in dock from the 13th October to 10th November 1840, ten; of the private ship *Morley*, in dock from the 22nd July to the 15th August 1841, ten; of the remaining ships, three fever cases were admitted from one, two cases from three, and one case from ten, respectively. From the remaining 152 ships, there were not any admissions of fever during the time they were in the dockyard.

The fevers from the ships *Orleana* and *Herefordshire*, I recollect very distinctly: I am in possession of a memorandum to the effect, that, on the 8th November 1840, there were twenty-six cases of fever in the hospital, of which there were twenty-two from these two ships, showing that the shipping in the harbour was comparatively free from the disease. The type was chiefly the mild remittent. The admissions from the ship *Morley* were of similar type; and during the time that the ship was in dock, H. M.'s frigate *Endymion* was also there, and part of her crew suffered severely from fever of a very malignant type. There were not more than three or four cases admitted into the General Hospital from the *Endymion*; but the following facts have been extracted by me from official records to which I have been allowed to refer.

The *Endymion* was in dock from the 19th July to the 19th August 1841. On the 28th July, the first cases of fever among the marines took place; from that date, to the 12th August, twenty-seven cases occurred; and to the 23rd, eleven more, and two additional cases were subsequently admitted, making altogether forty marines affected with fever in one month, all of whom had slept on board in the tour

to the disease as occurring in natives of good constitution.

I now proceed to consider the symptoms of the varieties of remittent fever which differ from the ordinary simple form.

Inflammatory Remittent Fever.—It was stated in reference to intermittent fever that the degree of febrile re-action of the hot stage had relation to the state of constitution, whether sthenic or asthenic. So it is also with remittent fever. In robust Europeans, lately arrived in India, exposed to malarious influence, and neglectful of the ordinary means of preserving health, remittent fever is likely to arise, and to have the characteristic phenomena of the exacerbation present in a very aggravated degree. This stage will then be attended with much headache, pain of limbs, and restlessness, much flushing of the face, perhaps, delirium.

of their duty during the time the *Endymion* was in dock; and in addition to these forty, there were only two others who slept on board. Thus of forty-two who slept on board occasionally, forty were affected with remittent fever; and to mark the severity of the type, up to the 30th of August, fourteen had died, and ten, several of whom were in a doubtful state, remained in hospital. Whilst such was the extreme suffering of the marines of the *Endymion*, whose duty as sentries over stores led to their exposure to the noxious night air of the dockyard, the following was the condition of the seamen. From the 24th June, the date of the arrival of the *Endymion* in Bombay, to the 30th August, there were ninety-five seamen (blue jackets), ill with fever. In none of these did the type resemble that of the marines, and none proved fatal; and it is distinctly noted that the carpenters employed *during the day* upon the repairs of the bottom of the vessel, with one exception, escaped any severe attack, and several of them were not attacked at all.

It is a rule of the dockyard, that the crews shall not sleep on board whilst the ship is undergoing repairs there; and the statements which have been just made show the salutary operation of this very necessary regulation.

The skin will be hot and pungent, the pulse full and frequent. A sense of oppression will be experienced at the epigastrium, with nausea and frequent vomiting. The tongue will be much coated, perhaps with florid edges and tips. There will be urgent thirst, and the excretions will be scanty and vitiated. The remission will be well marked, but it will bear relation to the degree of the exacerbation, so that the phenomena of disturbance in it may almost equal in degree those of the stage of exacerbation in the ordinary mild form of the disease. The term inflammatory, which has been applied to remittent fever, under these circumstances, must not be understood as implying the presence of local inflammation. It is merely meant to express the high degree of the febrile reaction.

Add to this variety of remittent fever, as now described, more of the influence of exposure to elevated temperature, or of excesses in drinking, and we shall have, as I believe, the phenomena of that compound variety to which I have already alluded,—in which the exacerbation is of longer, and the remission of shorter duration, and in respect to the classification of which as continued or remittent there is often doubt.

Remittent Fever tending to become continued,—then typhoid or adynamic in character.*—It has been stated that sometimes in simple ordinary remittent fever the exacerbations are double,—one in the day, another in

* I wish these terms to be understood, synonymously, as expressing the presence of undoubted indications of the failure of important vital actions. I would, as hitherto, have confined myself to the term typhoid; but it has lately been used by Dr. Jenner in a restricted sense in his very able analysis of European continued fevers; and, anticipating that in future it will be restricted to this sense, I am desirous of protecting myself from the risk of being at any time misunderstood.

the night. It was added that such were generally severe cases, not only of necessity so, from the circumstance of a greater number of the twenty-four hours being occupied by the phenomena of exacerbation; but also because it may happen that after the first or second day of these double exacerbations, or it may be from the very commencement of the attack, the remissions are so slight as to be hardly observed. The fever becomes almost continued in character.* This may have proceeded from the intensity of the malaria acting on an ordinary constitution; or from a less degree of malaria acting on a constitution of decided asthenic tendency; or (and this is probably a very frequent cause) from the early exacerbations not having been judiciously managed from neglect of the withdrawal of causes of irritation or excitement, or by the application of means of cure too depressant. Finally, the continued form may be favoured by the access of local inflammation.

When remittent fevers, which have thus passed into the almost continued form, do not prove fatal in the early stages from sudden depression of the nervous system or action of the heart, or from complication of congestion, or inflammation of some important organ, but continue beyond the eighth day, or earlier when the asthenia has been great, then a new train of symptoms

* The term continued having been already applied to a different set of circumstances from that in which it is here used, it would have been well, to prevent the risk of confusion, to substitute another term; but I am not prepared to suggest departure from usage. It can only be a very careless reader who will confound the *ardent continued* fever of the hot months, occurring in sthenic individuals, with fever generally remittent at the beginning, then becoming continued, occurring at malarious seasons, in constitutions asthenic at the outset, or made so by the intensity of the cause or injudicious treatment in the early stages.

begins to appear. The pulse becomes more frequent and feeble, the tongue dry and brown and unsteadily protruded. The hands are tremulous, with tendency to subsultus tendinum. There is more or less muttering delirium and drowsiness, and death takes place from exhaustion or coma. In other words, the remittent fever has assumed a typhoid or adynamic character. With this form of the disease in Europeans I became familiar in the General Hospital at Bombay; and in natives not only in the Jamsetjee Jejeebhoy Hospital, but also in all the other various circumstances in which I have had the opportunity of treating their diseases.

When the phenomena of depressed vital action, which have just been described, are present in their most aggravated degree, petechial spots may show themselves on the surface of the body; or there may be oozing of blood about the gums and lips, or epistaxis, or vomiting of blood or of dark-coloured grumous-looking fluid; or there may be mælæna or hæmaturia. These symptoms show, as we might anticipate would be the case, that the chemical and vital conditions of the blood have become most signally deteriorated. To instances of remittent fever in which these latter phenomena of deteriorated blood present themselves, the term *malignant* has been given. In their aggravated degree they are very rarely observed in the Bombay remittent; but, in their slighter degree, occasionally.

To what are these adynamic symptoms to be attributed? To the intensity of the cause perhaps; to the greater amount of febrile excitement consequent upon the fever having become continued; to the previous influence of predisposing causes, as insufficient food, lengthened exposure to hot weather, intemperance, depressing passions, or previous disease: or they may

arise from medical treatment having been neglected at the commencement, or to its having been too depressing in character,—too much general blood-letting, too free leeching, too much calomel, too much purgation, and the neglect of quinine.

When several of these conditions co-exist,—for example, intense malaria, predisposition from intemperance, want, or depressing passions, neglect of or injudicious medical treatment,—then are combined the conditions most calculated to produce a fever of a highly adynamic and malignant character.

Congestive Remittent Fever.—I use the phrase congestive in that sense in which it has been understood by late writers* when applied to fever, viz., a state which takes place at the outset of the disease, of depressed action of the vascular and nervous systems; the former characterized by an oppressed and feeble pulse, a coldish and frequently damp skin, an oppressed and sighing respiration, and a defective condition of the secretory functions; the latter by languor and drowsiness. This state has been attributed correctly, I believe, to the intensity of the sedative influence of the malarious poison. Such cases may prove speedily fatal either in the stage of congestion without distinct febrile reaction having shown itself, or reaction takes place and the remittent character of the fever becomes well marked, and, under careful management, it may terminate successfully. Or the remissions are badly marked, the fever becomes almost continued in type, and adynamic symptoms are early evolved. There is certainly, as remarked by Dr. Alison†, considerable analogy between the symptoms of this form of fever and those of cholera.

* Outlines of Physiology and Pathology. By Dr. Alison, p. 485.

† Outlines of Physiology and Pathology, loc. citat.

The collapse of cholera resembles in many particulars the stage of congestion; and when secondary fever takes place after cholera, it is not very unlike the kind of febrile action which sometimes characterizes the reaction of this congestive type of fever. There is however this difference, I think, that the secondary fever of cholera is apt to run a longer course, and is more certainly complicated with local subacute inflammation of important organs. I have met with occasional instances of this form of remittent fever in the European General Hospital, as well as in Europeans elsewhere in Bombay, and chiefly in the malarious season of the year. Very similar symptoms have also been observed by me in remittent fever in asthenic natives in the cold season of the year—natives who had been badly fed and badly clothed, and who had, previously to admission into hospital, been exposed to the inclemencies of the season.*

* A greater degree of these congestive phenomena, occurring in very malarious districts, has been described by authors. The term congestive has, however, been applied by English writers to other forms of febrile disease. This is to be very much regretted. Mr. Twining's "insidious congestive fever of the cold season" is different, and relates to sets of symptoms, some of which I have already alluded to under the head of typhoid or adynamic remittent fever, others of which I shall subsequently have to advert to; but none of Mr. Twining's descriptions express merely an undue degree and continuance of the phenomena characteristic of the cold stage. This seems to me the sense in which we should understand the term congestive fever, and while we thus use it, it by no means follows, that we are subscribing to any particular pathological doctrine as for example, that which attributes the phenomena of failing heart and nervous system to antecedent congestion of blood; on the contrary, all the phenomena seem to me to be coincident and sequences of the influences of the morbid cause.

Again, the term congestive has been used as in the Reports of the 4th Dragoons, formerly alluded to, in the sense of remittent fever

Remittent Fever with badly-developed Symptoms.—

I have remarked of intermittent fever that, when occurring in asthenic individuals, there is not unfrequently an absence of the characteristic stages of the paroxysm. Instances of remittent fever from time to time occur apparently allied in character to these. It is a form of disease not calculated to arrest attention. The febrile exacerbation is badly marked, and is not attended by much heat of skin or vascular excitement. Indeed, these symptoms may hardly be present; but, instead, some degree of undue restlessness or fretfulness, or incoherence of mind, with tremulousness of the hands, and the tongue coated in the centre; or there may be nausea with tendency to vomit or to diarrhœa. The remission is well marked; but the nights are generally restless. In cases of this kind, with each recurring exacerbation, the pulse loses strength, the tongue becomes drier and tremulous, tremors of the hands become very apparent, the slight wandering of the thoughts passes into muttering delirium, and, perhaps unexpectedly, about the tenth or twelfth day or earlier, the delirium lapses into coma; or the exacerbation terminates with extreme collapse and death.

Phenomena of this kind are, I think, described by Mr. Twining in his chapter on the “Insidious Congestive Fever of the Cold Season.” But they are not peculiar to this season; for I have witnessed them in Europeans in the European General Hospital in the months of June and July. The last instance of this train of symptoms which came under my notice was in an old officer about to leave India, who, in his journey

with marked congestion of the mucous tissues of the stomach or bowels, or of the liver. This is also, I think, a faulty use of the term.

to the coast, sustained a severe fracture of the fore-arm. This injury, with other causes of anxiety added to long service in India, had impaired his constitution. He became affected with the obscure symptoms which I have described. The most notable were restlessness, slight incoherence, then delirium, tongue coated and tremulous, hands also tremulous. The exacerbations and remissions were well marked, and death took place by coma.

This is a very important form of disease, and very liable to be overlooked. It calls for very guarded treatment, and above all for much watching. If there be much prostration, increasing from day to day, without any very evident cause, it may be assumed that at some time or other in the twenty-four hours a febrile exacerbation takes place, and its period of access should be ascertained without delay. We may the more certainly suspect this, if there be tendency in the tongue to become coated in the centre, then brownish and dryish.

Now it may be inquired, under what circumstances this form of disease may be expected to come before us. I believe, in individuals whose constitutions are enfeebled by debilitating causes—as exposure for successive seasons to elevated temperature, anxiety of mind, intemperance, the causes of scurvy, secondary syphilis, the abuse of mercury, the influence of malaria; and it is not unlikely that in some instances it may be found related to old structural disease. But to this latter condition I shall more fully allude under the head Pathology.

Remittent Fever with Symptoms of unexpected Collapse.
—It was remarked that in asthenic individuals the third stage of intermittent fever was sometimes marked

by so much exhaustion as to call for the assiduous use of stimulants and nourishment. The same clinical fact, as might be anticipated, is observable much more frequently in remittent fever, at the close of an exacerbation.

There is no practical fact of greater importance in the management of remittent fever than the marked tendency so often evinced to great collapse towards the conclusion of the febrile exacerbation — collapse not unfrequently terminating in death.*

It was in the writings of Mr. Twining that I first became acquainted with this truth. It is amongst the most valuable of his many excellent clinical observations. From what I have witnessed and heard, I am satisfied that it has not generally made upon the minds of medical men in India that deep impression which, from experience of its truth, I am certain that its importance demands.

We have seen that from the influence of malaria, from predisposing conditions, from continuance of febrile excitement, after a time, sooner or later in different cases, but arriving, some time or other, in all protracted cases of fever, there takes place a marked depression of most of the vital actions, but chiefly of those of the heart and nervous system. In remittent fever, when such period of depression has arrived, it will be most apparent during the remission; generally first showing itself at the very commencement of the remission, or just as the exacerbation is passing into it. We must be careful that towards the close of a paroxysm of remittent fever under these circumstances, we do not use means,

* It seems to me that it is to the occurrence of this collapse early in the disease, that the term *Algide* has been applied by Dr. Haspel and other writers on the diseases of Algeria.

—as leeches, purgatives, antimonials,—calculated to hurry on and increase this depression.

It is under these circumstances of fever, by the injudicious use of these depressant means, though sometimes independent of them, that unlooked-for collapse—thready pulse, shrunk features, a cold and damp skin—is apt to take place. This tendency to collapse I have frequently witnessed, and, in more than one instance, its termination in death.

The practical lesson to be learned from these facts is this, that in all remittents, after the 7th or 8th day, or earlier if the pulse has been feeble or the hands and tongue tremulous, or the mind wandering, or any other symptom of debility present, we should be careful to avoid depressant means of treatment, more especially towards the close of the exacerbations, and to attend to careful nourishment in small quantities and frequently repeated during the remissions. We should always be prepared, at the close of a paroxysm, to watch for symptoms of undue collapse, and should these begin to appear, then liberally to administer stimulants and nourishment as ammonia, wine, and strong animal broths. Cases of remittent fever have been lost, to my knowledge, from want of forethought and preparation to carry out these very evident indications of treatment. I quote the following as an instance of unlooked-for collapse, terminating fatally, in remittent fever.

25. *Remittent Fever fatal from unexpected Collapse.*

A gentleman of about fifty years of age, of sallow complexion, who had lived several years at different times in tropical climates, and had experienced his share of the cares of life, became in Bombay the subject of remittent fever. After the illness had continued four or five days, his medical attendant, a gentleman of intelligence and experience, not satisfied with the state of his patient, yet not anxious in regard to his

safety, wrote to me at one of his evening visits a note requesting me to meet him the following morning. The note was not to be delivered till the early morning, but it was so at midnight, accompanied with an urgent verbal message, begging me to come immediately. The house was in my neighbourhood, and I was there in a very short space of time, but I found that the patient had just died. The evening febrile exacerbation had terminated in unexpected and fatal collapse.

I quote the following illustrative case from Dr. A. S. Thomson's report* on fever in Her Majesty's 17th Regiment, at Coluba, in the year 1841, an epidemic to which I have already alluded in the chapter on intermittent fever.

* 26. *Great Collapse in the course of Remittent Fever.—
Recovery by Stimulants.*

Private W. S., aged twenty-two years, in India three years, sanguine habit. Admitted on the 1st July, 1841, complaining of general debility, &c. A vein was opened, but he fainted before many ounces slowly came, and no more could be got; had an emetic and purgative; he afterwards complained of headache and had sixty leeches applied to the head, and a diaphoretic mixture constantly given. 2nd of July, pulse 84, skin hot and moist, no pain. Continued the diaphoretic mixture. At night occasional delirium, skin moist and hot, bowels open; eyes wild; pulse 124 soft; complains of abdominal pain. A blister was applied to the neck and head, and a draught composed of wine, tinct. morph. muriat. and tartar emetic given; the head to be rubbed over with strong tartar emetic ointment.

3rd. Slept a little after draught; pulse 120; skin moist; bowels open; much irregularity in his manner. Diaphoretic mixture and wine every second hour with forty drops of tinct. muriate of morphia at night.

4th. Pulse 79: skin moist; eruption on head from the antimony; slept none; bowels open; occasional delirium. The wine and diaphoretic mixture continued; at night five grains of calomel and five of hyoscyamus.

* Transactions of the Medical and Physical Society of Bombay, No. V. p. 89.

5th. Slept well last night, no fever; pulse 76. Six grains of quinine every third hour. *Vespere*. Calomel, antimony and hyoscyamus.

6th. Fever with delirium came on yesterday at noon, and has continued since, had sixty leeches to the head, and this morning pulse 109; skin hot and dry; head warm and temples throbbing; thirty leeches applied to the head, and diaphoretic mixture given.

7th. The most fearful collapse followed the application of the leeches and the fever; skin covered with cold perspiration and pulse scarcely felt. Brandy and carbonate of ammonia given every ten minutes. Had forty drops of tincture of morphia last night, and slept well. Pulse 106 this morning; skin cold and clammy; no pain; the brandy and carbonate of ammonia to be continued.

8th. Strength impaired; pulse 120; skin hot. Diaphoretic mixture to be given with wine; bowels open.

9th. Pulse 96; skin hot and moist; no pain; occasional delirium.

It is useless to detail this case further, no violent paroxysm of fever occurred again, although there was occasional slight increase of fever. He was convalescent on the 31st of July, but was not fit for duty until the 11th of September, 1840.

It is almost a corollary from the feature of remittent fever which we have just been considering, that, when protracted, the period of death in fatal cases of this type of fever will be found to be not that of the exacerbation, but that of the remission.

Certain other occasional Features of Remittent Fever.—

1st. It occasionally happens that what in the issue is to be a severe case of remittent fever does not appear so from the commencement. There may have been a day or two of slight exacerbations, then though the treatment may have been good, the disease assumes a severer character as regards degree and duration of exacerbation, and amount, and number of particular derangements. Perhaps this feature may be explained by supposing that in the early days the incubation had not been complete, and that its becoming so is coincident with

the aggravation of the symptoms. The suggestion may be further thrown out that, if this explanation be reasonable, we can readily understand that treatment too depressing in the early days may favour the influence of the malaria present in a state of incubation.

2nd. In remittent fever in asthenic constitutions there may be a decreasing degree of the febrile exacerbations, but if it be attended with marked increasing asthenia in the remissions, we must be careful not to interpret the lessening exacerbation as of favourable import: it is generally not so; it has merely decreased in harmony with the decreasing power of the vital actions. Such cases, if misunderstood, and not very carefully watched and treated, will be found to terminate fatally, when not expected, by collapse at the close of an exacerbation.

3rd. In remittent fever we may sometimes observe the period of exacerbation replaced by one of great exhaustion; and if such cases do well, the recurrence of febrile phenomena at the period of exacerbation may probably be looked upon as of favourable prognosis. I quote a fatal case in which this feature was observed.

27. *Exhaustion taking the place of Exacerbation in Remittent Fever.*

A gentleman, some years resident in India, living freely and suffering from occasional attacks of intermittent fever with irritability of stomach, in the malarious season of the year, consulted me for irritability of stomach, which soon ceased, but there remained complete disinclination for food. Some nights he slept badly, others well; sometimes from a morphia draught, sometimes without one. He complained only of great languor, and looked very exhausted. Three or four glasses of wine, with beef-tea and jellies, were taken daily. He continued for three

or four days afterwards attending to his avocations till one afternoon febrile heat of the skin was for the first time noticed; it was present during the night and the following morning, but then in less degree. Eight-grain doses of quinine and nourishment were given. At noon there was exacerbation, but towards the afterpart of the day he became very feeble and exhausted. Wine and nourishment were freely given. He rallied towards night, and passed the night quietly. On the following morning he was free of all fever and much less exhausted than on the previous day. The quinine was resumed, and beef-tea and wine were freely given. At one P.M. there was rather more exhaustion, but no fever. The wine was more frequently given, and the quinine and nourishment continued, but without effect. The exhaustion increased towards evening. Brandy was substituted for the wine; he continued quite collected till midnight, when he became somewhat drowsy, and died at four o'clock of the following morning. In this case there was no vomiting. The wine and nourishment were retained. There was no diarrhoea.

COMPLICATED REMITTENT FEVER.

With Cerebral Symptoms.— Under this head I do not include the symptom headache, which is present so very generally in different degrees in the stage of reaction of idiopathic febrile disease, and which, as already stated, will be met with in the exacerbation of ordinary remittents in less and in inflammatory remittents in greater degree.

But I refer to those instances of the disease in which there is evident derangement of the cerebral functions, in which there is present some degree of delirium, of drowsiness, or of convulsion.

Delirium occurs in remittent fever under two sets of circumstances. It may come on in the early exacerbations attended with much headache, flushing of the face, and injection of the conjunctivæ, and may be more or less active in its character. This is the form which we may expect this symptom to assume in sthenic constitutions, and at the commencement it will be un-

attended with signs of failing action of the heart. Or we may have a modification of this state in less sthenic individuals: the delirium will then be more of the character of incoherent rambling; there will be less headache and flushing of the face, and though there may not be present any distinct adynamic phenomena, yet the pulse will be wanting in power.

Delirium is for the most part chiefly observed in the exacerbations, and though not altogether absent in the remissions, is generally very much moderated.

Should medical treatment fail in checking the fever, and removing these head symptoms, then, after a time varying in different cases, the delirium gradually passes into drowsiness, coma, and death. This change will, I believe, generally be first observable towards the termination of an exacerbation, and will be attended with marked failing action of the heart.

When these cerebral symptoms occur under the circumstances just described, they may be considered to depend upon the coexistence of inflammatory action, or undue determination of blood to the brain and its membranes.

Delirium, however, may also show itself for the first time at a more advanced period of the fever—after the eighth or tenth day; later, perhaps, where the constitution has been good, earlier where it has been bad. It will be low and muttering, unattended with complaint of headache or notable flushing of the face, but associated with commencing adynamic symptoms—tremors of the hands, twitching of the fingers, a tongue tremulous and dryish, and a pulse of increasing frequency and failing strength. Should amendment not take place in such cases, the delirium will after a time pass into drowsiness, and death will take place by coma, unless it occur from

collapse at an earlier period before the stage of coma has arrived. It may be reasonably inferred that the symptoms of deranged and failing cerebral function in adynamic fever are merely the expression of the general failing vital actions of the brain.

From the description which has just been given of the symptoms of cerebral derangement in fever, it appears that a marked difference between those of adynamia and of active determination to the brain, is the coexistence, with the delirium of the former, of tremors of the tongue and hands, and twitching movements of the fingers. At one time I attached too much importance to the presence of these deranged muscular movements as diagnostic of merely an adynamic state. I have since so frequently met with them in association with subacute inflammatory action, both idiopathic and complicating fever, that I no longer place confidence in them as indicative of simply adynamic derangement of the nervous system, unless the other phenomena of this state are well marked, and the history of the case distinctly points to the same conclusion.

It has been stated that the delirium passes into drowsiness.* This symptom, when thus arising, is of most unfavourable prognosis. But drowsiness occasionally appears in the course of remittent fever unpreceded by delirium. It then generally occurs in the earlier stages, with a pulse of less than normal frequency, and is sometimes distinctly related to initiatory congestive phenomena. When drowsiness occurs under these cir-

* The liability to retention of urine in this state of the cerebral functions, is so well known that it seems almost unnecessary to allude to it. Yet I have seen it overlooked sufficiently often to convince me that attention cannot be called too frequently to the fact.

cumstances, it is by no means so dangerous a symptom as when it succeeds a stage of delirium. Care should be taken not to confound them. The first is probably dependent on passive congestion; the second on commencing serous effusion. Lastly, there are also cases with head symptoms—delirium, tendency to drowsiness—coming on early towards the end of the paroxysm in fevers of bad type, associated with signs of general collapse and produced by enfeebled nervous energy.

In the chapter on Intermittent Fever I have narrated a case in which the period of paroxysm alone was marked by the symptoms of local derangement. The same feature is also observable sometimes in remittent fever. In cases with cerebral symptoms, in asthenic individuals, it may occasionally be noticed that the period of exacerbation is indicated by increase of the delirium, or of the drowsiness—whichever may be the coexisting symptom—rather than by marked aggravation of the febrile phenomena.

In some cases convulsion may take place intermediate between the stage of delirium and of coma. This event will be found generally to depend on excesses in drinking, or on derangement of important excretory functions from structural or other causes, or on inflammatory action of the membranes or substance of the brain.

Irritability of Stomach.—It has been stated, that occasional vomiting may be present in ordinary remittent fever, and may occur in greater degree in the severer inflammatory form of the disease. Under these circumstances it may be looked upon as among the symptoms of the uncomplicated type.

But irritability of stomach may be urgent, attended

with uneasiness and tenseness of the epigastrium, and a tongue florid at the tip or edges. In this state there is probably inflammation of the mucous membrane of the stomach. It may occur in constitutions either sthenic or asthenic. Remittent fever thus complicated has been termed *Gastric Remittent*. At other times the vomiting is frequent, and the matters ejected are tinged with bile, and the tongue is covered with a yellow fur, but without the florid edges and tip. This form of the disease is confined to sthenic constitutions; it is that to which the term *Bilious Remittent* has been given.

Remittent Fever complicated with Jaundice.—I have witnessed this complication occasionally in Europeans in the European General Hospital, but still more frequently in natives. The notes of twenty-seven cases treated in the clinical ward are before me. To these I shall more particularly allude in connexion with the Pathology of the disease.

The presence of jaundice is of course easily recognised by the tint of the skin and conjunctivæ, the state of the urine, and generally pale colour of the alvine discharges. With few exceptions there is present distinct tenderness below the margins of the right false ribs. The jaundice is rarely observed from the very commencement of the fever. It generally comes on after the fifth day, and has not, as a rule, been attended with irritability of stomach. The tongue for the most part presents a yellow slimy appearance, and general soreness of the body is not unfrequently complained of.

The few observations which I have to make on affections of the *bowels*, the *liver* and *spleen*, as complications of remittent fever, will be included under the head Pathology.

Bronchitis and Pneumonia.—These affections are not

frequently met with as complications of remittent fever in Europeans in India; but we are told by Dr. R. H. Hunter*, in his interesting Medical History of the Queen's Royal Regiment, while in Affghanistan and Beloochistan, in 1838 and 1839, that in the colder climate of these countries, chiefly in the winter months, pneumonia was the most commonly observed complication of remittent fever, and was of frequent occurrence.

Bronchitis is a common complication of remittent fever in India; and in the Jamsetjee Jejeebhoy Hospital at Bombay, I have found pneumonia to be the most frequent of all the inflammatory complications in asthenic natives. Indeed, so much so, and so generally is this derangement present, that we run great risk in this class of patients, of committing errors in practice, by overlooking the existence of pneumonia, unless in the management of all fever cases we adopt the practice of careful examination by percussion and the stethoscope. But it is not only in hospital patients that we meet with this complication, I have witnessed it in all classes of the native community; and in not a few instances it had been previously overlooked, to the great hazard of life, merely because it had not been sought for.

The detailed consideration of this important form of disease will be made in connexion with the subject of Idiopathic Pneumonia.†

Diagnosis of Remittent Fever from Hectic and Symptomatic Fevers.—The distinction of remittent from intermit-

* Transactions of the Medical and Physical Society of Bombay, No. III. p. 183.

† This arrangement was followed by me in drawing up a clinical report on this subject about a year and a half ago. It has its advantages, but even were it otherwise, the limited time at my command for the execution of this work, will not permit of its alteration now.

tent and continued fevers has already been noticed; but the further diagnosis will be more conveniently considered now. The frequency of the complication of inflammation of important internal organs with this type of fever has been stated. In a general hospital, in which admissions often take place at advanced periods of disease, and in which a large proportion of the inmates are very asthenic in constitution, affected with local inflammations, characterized by great obscurity of symptoms, it is possible enough that hectic may be mistaken by the superficial observer for remittent fever.* Careful inquiry into the previous history of the case, and scrutiny, by attention to symptoms and physical signs, into the state of all important organs, ought to obviate an error of this kind.

When an abiding malarious influence is present, febrile disturbance excited by ordinary causes may assume more or less of a periodic character. It is equally true, that when an individual, the subject of an abiding malarious influence, becomes affected with idiopathic inflammation of an important organ, the symptomatic fever may assume more or less of a periodic character—may, in fact, be distinctly remittent in type.† Of the accuracy of this clinical observation, I am convinced from experience. It is practically important, as I shall afterwards explain. It is brought forward now with reference to a question of diagnosis.

It is in individuals who have been long resident in

* The diagnosis between remittent fever and the adynamic febrile disturbance of pyæmia, will be considered when I notice this latter affection.

† The same fact is often observed in surgical practice, when individuals of this kind of constitution become the subjects of serious injuries.

tropical climates, and whose constitutions have in consequence become deteriorated, that this tendency of symptomatic febrile disturbance to become remittent is chiefly observed. In them, therefore, the question must occasionally arise when local inflammation and remittent febrile symptoms coexist—whether the fever is idiopathic and complicated with an inflammation, or the inflammation idiopathic and the fever symptomatic. In determining this question we are materially assisted by the history of the attack. The inflammatory complications of remittent fever do not generally take place till several days after the commencement of the fever, whereas the symptoms of idiopathic inflammation and the febrile disturbance are nearly coincident.

Moreover, in idiopathic fever, the febrile phenomena are usually greater in proportion to the inflammatory action, and are attended by a greater amount of general derangement of function.

But notwithstanding attention to these points, the diagnosis is often uncertain, for in hospital practice the history of disease is generally imperfect. It is fortunate, however, that the doubt which may thus arise does not affect the treatment, for the same therapeutic principles are applicable to both forms of disease.

SECTION III.

PATHOLOGY.—**MORTALITY FROM REMITTENT FEVER.**—RELATION OF TYPE TO DIATHESIS AND PREVIOUSLY EXISTING STRUCTURAL LESIONS.—COMPLICATION WITH CEREBRAL AFFECTION AND CONSIDERATION OF THE PATHOLOGICAL IMPORT OF CRANIAL SEROUS EFFUSION.—COMPLICATION WITH GASTRIC IRRITABILITY, AFFECTION OF THE BOWELS.—HEPATITIS, JAUNDICE, PAROTITIS, AND PNEUMONIA.

PATHOLOGY.—When we compare the effects of malarious influence—the cause of intermittent and remittent fever—with those of the morbid causes of the zymotic continued fevers of the colder climates, we observe this striking difference. In the former, there are daily suspensions of the effect with tendency more or less to a return to normal actions. In the latter, the effect is continuous for many successive days. On this difference centres, as I shall afterwards more fully explain, the difference in the principles of treatment.

The rate of mortality from remittent fever will depend upon the character of the disease, and the period when it has been submitted to treatment. Just as was observed in respect to simple intermittent fever, I am not acquainted with any data which, separating simple remittents, give the mortality of this form alone. It is doubtless very small. It is the inflammatory, congestive, adynamic, and complicated varieties which cause the chief mortality; and, in general hospitals, the frequently late period of admission also tends to increase it.

In 113 selected clinical cases of natives, 19 deaths occurred. Nine of these were complicated with jaundice, 3 with cerebral affection, 3 with pneumonia*,

* These are distinct from the cases which I shall have to notice when considering Idiopathic Pneumonia.

2 with bronchitis, 1 with dysentery, and 1 with splenic enlargement. In 7 of the 19 fatal cases, the fever was adynamic, viz. in the 3 with cerebral affection, the 2 with bronchitis, 1 with pneumonia, and 1 with jaundice.

Through the courtesy of the Medical Board of Bombay, I have had the opportunity of referring to the fatal cases of European officers in the Bombay army and civil service, and also to the cases of those recommended for change of climate, from the year 1829 to 1848. They amounted to 1699. I made notes of those recovered cases which interested me most: they were 372 in number, and 49 were cases of remittent fever.

I have also notes of 311 fatal cases, which constitute nearly the whole mortality of the period: of these cases there were 90 deaths from remittent fever, that is, 28·7 per cent. of the total mortality.

On inquiring into the character of the fever in these 90 fatal cases, I find that in 33 death took place by coma, preceded by delirium, with intermediate convulsion in some cases. In a considerable proportion of these cases, irritability of stomach was present; in 6 it was the most prominent symptom. Death took place from early and quickly-forming collapse in 12 cases, and in the greater number of these the influence of depressant remedies pushed too far in the exacerbation was very apparent. Typhoid phenomena were present in 8, and congestive phenomena also in 8; jaundice complicated 7, and hepatic inflammation 2.*

Before proceeding to the consideration of the pathology of the several varieties of remittent fever, it is

* I shall return to the mortality from remittent fever in my remarks on the tabular statements at the end of the 3rd chapter.

desirable that attention should be directed to two general observations which are applicable to all.

Inattention to the diathesis and habits of the individuals affected, and to the intensity of the morbid cause, has led to needless confusion in the pathology, and serious errors in the treatment, of remittent fever. The explanation of the discrepancy of opinion on these points, between the writers on tropical diseases, towards the end of the 18th century and those of a later period, will be found in this omission. The former observed the disease in individuals tainted with the causes of scurvy, and excited by an intense malaria; the latter, in persons of sthenic constitution, and excited by a less degree of the morbid cause. The one trusted to bark and stimulants for the cure; the other, to bloodletting, mercury, and purgatives. Both were in extremes. The truth lies between.

2. Twelve years ago, when writing* on the subject of remittent fever, as occurring in the European General Hospital in Bombay, I observed, "in regard to the character of the subjects in whom these congestive symptoms are likely to appear, my impression is that they will be found to occur most frequently in persons who have passed the meridian of life, and in whom there exists more or less long-standing organic disease of the heart, the liver, or the kidneys."

Subsequent experience has confirmed my opinion of the importance of this suggestion, not only as regards congestive symptoms, but also all other phenomena of depressed action; as well as in respect to some of the complications, the cerebral for example.

Indeed it is, to me, very evident that we cannot grasp

* Transactions of the Medical and Physical Society of Bombay. No. VI. p. 186.

the entire subject of a given case of fever, or direct its treatment with the full light of science, unless by close inquiry into the previous history, and careful scrutiny of the state of all important organs, we determine whether we have to do with an idiopathic fever in a system previously sound, or in one in which an important organ is structurally imperfect.

Haspel *, I observe, in his treatise on the diseases of the French troops in Algeria, gives expression to the same idea, when he intimates that the phenomena of Algide fever may probably be related to a structurally feeble heart.

In my notes on the fatal cases of sick officers, I observe three of remittent fever, in which, after death, Bright's Disease of the Kidney was found; but in only one is the character of the febrile symptoms noted. They were obscure, the stomach was irritable, and death took place by coma.

The five following cases †, illustrative of these remarks, were observed by me in the European General Hospital, and in the Jamsetjee Jejeebhoy Hospital.

28. *Remittent Fever—Death by Coma—Bright's Disease of both Kidneys.*

John Robinson, aged thirty-seven, a stout sailor, of intemperate habits, was in the European General Hospital, from June 28th to July 1st, 1838, affected with anasarcaous swelling of the feet and legs. He was discharged, and had returned to his duty on board one of the steam-vessels. He was again brought to the hospital on the 12th July in a drowsy state, answering questions with difficulty. The pulse was frequent and small,

* *Maladies de l'Algérie*, vol. ii. p. 320.

† These cases are quoted merely as illustrative of febrile phenomena in individuals with old structural disease of important organs. I do not stop to inquire whether the treatment might have been better or not.

and the skin warm; the tongue had a yellow fur at the sides, but was florid in the centre. It was gathered from his own statement, that he had suffered from fever since the 8th, that he had been affected with vomiting and relaxed bowels; but that he had not been ashore since he left the hospital on the 1st instant. His head was shaved, a blister was applied to the neck, and ten grains of calomel were given. At six P.M. the drowsiness had increased; the skin was moist and cold; the pulse frequent and feeble; and the bowels had not been opened. A turpentine injection was exhibited; sinapisms were applied to the feet, and a blister to the epigastrium; a draught with camphor mixture, carbonate of ammonia, and nitrous æther was given every third hour. On the 13th, the bowels had been freely moved; there was less drowsiness; the pulse was 100, small and sharp. The draughts were directed to be continued, with the addition to each of fifteen minims of colchicum wine, and a scruple of calomel was given at bed-time. The drowsiness recurred, and increased to coma. The pulse sunk; and he died at four A.M. of the 14th.

Inspection four hours after death.—The body was stout and muscular.—*Head.* The membranes and substance of the brain were congested.—*Chest.* The lungs did not collapse fully, and there were costal adhesions of the right one. The heart was soft, flabby, and contained fibrinous coagula.—*Abdomen.* The liver was pale, and parts of its surface were marked with cicatrices, as if from former abscesses. The mucous coat of the stomach was of dark red colour and softened. That of the colon and rectum also was of dark red tint. Both kidneys were enlarged to double their natural size, and had undergone yellow degeneration.

29. *Remittent Fever, with Adynamic Symptoms.*—*Serum underneath the Arachnoid and at the Base of the Cranium.*—*No Coma.*—*The Liver much enlarged.*—*Dark Rosy Tint of the Mucous Coat of the Stomach.*

John Martin, aged fifty-eight, cook of the ship Herefordshire, was admitted into hospital on the 31st of October, 1840. He stated, that for two days he had suffered from vomiting, purging, headache, and sense of oppression at the lower part of the sternum, which complaints he attributed to exposure to the sun whilst the ship was undergoing repairs in dock. On admission, the face was flushed; there was anxiety and oppression; the pulse was 120, jerking, and easily compressed; abdomen

full; tongue dryish and florid; skin hot and dry. He was freely leeches on the epigastrium and blistered; was cupped on the nucha, and subsequently blistered. He took two or three ten-grain doses of calomel, and one of a scruple. The symptoms altered little. There was much restlessness and moaning; oppressed breathing; frequent vomiting; dejections of dirty light grey colour, and watery; tongue dry and florid; pulse frequent and compressible; skin dry, and generally above the natural temperature; abdomen full. He continued quite sensible, and died in the forenoon of the 2nd November.

Inspection five hours after death. — *Head.* There was a thin veil of serum under the arachnoid membrane on the convex surface of the brain, and an ounce of serum at the base of the skull. On incising the substance of the brain, there were more than the usual number of bloody points observable. — *Chest.* There were old adhesions of the right lung. The lungs were moderately collapsed, and there was no congestion of the posterior parts. The cavities of the right side of the heart were full of blood; and there was commencing disease of the aortic valves and beginning of the aorta. — *Abdomen.* The omentum was loaded with fat; the intestines, both great and small, were collapsed. The liver, enlarged, reached to the crest of the os ilium and to the umbilicus. It was of pale yellow colour; and, when incised, did not give out much blood. The gall-bladder was rather flaccid. The spleen was soft and pulpy. The mucous coat of the stomach had a dark rosy tint general throughout, with dark brown patches, but the texture was not softened. The kidneys were somewhat lobulated and rather small; but there was no well-marked disease of their structure.

30. *Remittent Fever with irregular Symptoms occurring in an Intemperate Man of very Corpulent Habit, and in whose Head, Heart, Liver, and Kidneys there was extensive old Organic Disease.*

Thomas Moss, aged thirty-seven, an engineer of the steam department, of full and corpulent habit, who had served ten years in the West Indies, and ten months in Bombay, was admitted into the European General Hospital on the 5th April, 1841. The abdomen was full and uneasy, but not very tender on pressure; the skin was dry and of the natural temperature; the pulse 100 and sharp; the tongue was pretty clean. He stated, that since the previous day he had suffered from pain of abdomen, with occasional bilious vomiting and purging.

He was bled to twenty ounces, and some leeches were applied to the abdomen, a warm bath used, and fifteen grains of calomel, one grain of ipecacuanha, and two grains of opium given at bed-time. He passed a restless night; and, on the morning of the 6th, the breathing was hurried and oppressed. The abdomen was full with hepatic sound on percussion for two or three inches beyond the margin of the ribs, and extending across the epigastrium to the left hypochondrium, also between the last left false ribs and the os ilium. The pulse was 120, easily compressed, but wiry; the action of the heart and the sounds were confused; tongue coated; bowels not opened; no vomiting; and the conjunctivæ were yellowish. He was cupped on the cardiac region; a scruple of calomel was given, and afterwards a purgative draught. The bowels were freely moved; but the symptoms were unchanged, with exception that the pulse on the evening of the 5th was feeble. It was now reported that he had been a man of irregular habits and a free liver. A blister was applied over the cardiac region; diuretics with gin were given repeatedly. The symptoms continued with little change, the pulse losing strength, and the skin being generally coldish, with, on the morning of the 7th, commencing coma: he died at 10 A.M. of that day.

Inspection five hours after death.—The body was extremely corpulent; and there was a layer of fat fully two inches thick in the abdominal parietes.—*Head.* Much blood flowed on separating the scalp from the cranium. All over the convex surface of the hemispheres the arachnoid coat was pearly, and in many places very much thickened; underneath there was a layer of serum veiling in many places the interspaces of the convolutions. There were about three drachms of serum in the lateral ventricles, and two ounces at the base of the skull. In the coats of the basilar artery, those of the arteries forming the circle of Willis, also the vessels given off from the circle and passing between the lobes of the hemispheres, there was much thickening from white deposit, in places, almost ossific in character; in these vessels there was a small coagulum of blood moulded to the shape of the canal.—*Chest.* Adhesions connected both lungs to the costal pleuræ. The greater part of the lower lobe of the right lung was in a state of red hepatization, and serum streamed from it when it was incised. The left lung posteriorly was œdematous, but not hepatized. The heart was the size of a bullock's, chiefly from hypertrophy, with dilatation of the left ventricle; the right ventricle was rather small; the right auricle was dilated and occupied, as also the ventricle, by a firm yellow

fibrinous concretion. There was commencing yellow deposit on the inner surface of the aorta; but it had proceeded to no great extent. — *Abdomen.* The contents of the abdomen ascended to the level of the fourth rib, and thus encroached on the capacity of the chest. The omentum was much loaded with fat; the mesentery consisted of a layer of fat fully a quarter of an inch thick; the small intestines were in general contracted, and looked like a fringe to the more conspicuous mesentery. The liver was very considerably enlarged, of bright yellow colour externally and internally; the incised surface had a small granular aspect. Spleen healthy. Both kidneys were considerably enlarged, with cysts from the size of a pea to a filbert standing in relief from the surface. The substance of the kidneys was also occupied by similar cysts; the contents of some consisted of a dark grey grumous fluid; of others, of straw-coloured serum. In one of the kidneys there was also a good deal of yellow deposit.

31. *Remittent Fever in a Person of very Intemperate Habits, with Symptoms in some respects resembling Delirium Tremens. — Death by Coma. — Three Ounces of Serum at the Base of the Skull; Liver much enlarged. — Commencing Degeneration of the Kidney. — Mucous Coat of the Colon softened, with here and there Red Patches, with a Mucous Follicle in the Centre of each Discoloration. — Softening of the Mucous Coat of the Stomach.*

Thomas Chittenden, aged thirty-four, an engineer of the steam department, of intemperate habits and frequently in hospital, suffering from febrile attacks, was admitted into the General Hospital on the 30th of August, 1839. He stated that for eight or nine days he had been affected with febrile symptoms attended with irritability of stomach. On admission he complained much of headache. The bowels were relaxed and the tongue yellow. Thirty-six leeches were applied to the temples, and six grains of calomel, one grain of ipecacuanha, and one of opium were given. At the evening visit it was reported that he had vomited frequently and been affected with general tremors which continued. The tongue was tremulous and yellow. The abdomen was somewhat full and tender on pressure at the epigastrium and right ribs.

There was much headache. The skin was covered with moisture and the pulse was compressible. The bowels had not been opened. A purgative enema was ordered; blisters were directed to the epigastrium and to the nucha, and ten grains of calomel, and two grains of opium, were given at bedtime. The blister acted well, and on the morning of the 31st. (full moon) the headache was lessened, the pulse ninety, and the tongue not so tremulous. He was ordered saline mixture with tartar emetic solution and tincture of hyoscyamus. He slept for two hours during the day and his bowels were freely moved. During the night, there was no sleep; and on the morning of the 1st of September, the tongue and hands were tremulous, the countenance flushed, and the pupils dilated; pulse ninety-six. Cold affusion was ordered to the head, and saline mixture with tincture of hyoscyamus two drachms every second hour for three doses. At the evening visit he was still tremulous, his manner was startled, and he muttered to himself; the pulse was feeble and the skin moist; one dark-coloured dejection had been passed. Cold affusion to the head. Camphor mixture one ounce and a half, antimonial mixture four drachms, tincture of hyoscyamus two drachms every second hour till he sleeps; brandy one ounce every hour for three doses, and then every second hour. Calomel eight grains, opium one grain h. s. The pills were taken; also four ounces of brandy and the draught three times; but he continued agitated, talking incoherently and tearing the dressings from the blister. At midnight there was constant inarticulate muttering. There was general agitation and spasmodic action of the muscles of the face, the pupils were dilated and insensible to light; the skin was hot; the pulse rapid and feeble. Cold affusion was directed to be used to the head every hour whilst the scalp continued hot; and cold lotion to be kept constantly applied; sinapisms were placed on the feet and the other remedies omitted. He became comatose and died at six A.M.

Inspection nine hours after death.—The body stout, and the external surface tinged deeply yellow.—*Head.* The dura mater was faintly tinged yellow; the vessels of the membranes were moderately congested. The convolutions of the convex surface of the depending parts of the hemispheres, were veiled with serum effused beneath the arachnoid membrane. There were between two and three ounces of serum at the base of the skull.—*Chest.* The lungs were emphysematous and only partially collapsed. The heart was healthy. The cavity of the chest was encroached on by the liver, which on the right side reached to

the fourth rib and coursed obliquely across to the seventh rib of the left side. — *Abdomen.* Omentum loaded with fat. The liver weighed seven and a half pounds, was externally mottled chocolate and buff, and admitted of the ready separation of the peritoneal coat. The incised surface was of yellow colour, mottled and softened. The gall-bladder contained about an ounce of thin bile. The mucous coat of the cardiac end of the stomach was of dark marbled red colour, somewhat thinned and somewhat softened; the pyloric end pale and mammillated. There was vascularity of the commencement of the mucous coat of the duodenum, but the texture was sound. The large intestine was distended throughout, but there was no thickening of its walls; the mucous coat was tinged yellow, was thinned, and generally softened; the mucous follicles were in many places apparent but not prominent. Throughout the colon there were red patches here and there, mostly the size of a split pea, some larger. In the centre of many there was a mucous follicle, and in these places the mucous coat was thin, soft, and pulpy, and after its removal the cellular tissue underneath presented in some instances a vascular patch. The gut was filled with thin yellow feculence. The spleen was of natural size. The kidneys were nearly natural, with perhaps commencing yellow degeneration of the cortical substance, evinced by buff streaks.

32. *Remittent Fever with Adynamic Symptoms. — Obscure Pneumonia. — Death without Coma. — Bright's Disease of both Kidneys.*

Crooshnah Sutooa, aged twenty-six, a Maratha labourer, was brought to the Jamsetjee Jejeebhoy Hospital on the 5th of July, 1852, being the first day of his illness, with febrile symptoms. There was slight jaundice, and he was reported to have been delirious during the night. There were irregular exacerbations and remissions, and the pulse was frequently badly developed. He had uneasiness at the margin of the right ribs. There was not much delirium, neither brownness nor dryness of tongue. The breathing was hurried, but no signs of pneumonia were noted before the 13th, when there was slight dullness of the right dorsal region which however did not increase, and on the 20th occasional crepitus was detected in the right lateral region. He had occasional cough. On the evening of the 20th there was commencing erysipelatous inflammation of the back, with large bullæ resting on a dark base. On the 21st. the pulse became feeble, the breathing more hurried, and

he died without coma on the 23rd. The state of the urine had not been inquired into.

Inspection eighteen hours after death.—*Chest.* There were old adhesions of the third lobe of the right lung to the parietes and to the diaphragm. There was slight serous effusion in the sac of the right pleura. There was increased redness of the substance, and considerable œdema of the right lung, with hepatized nodules here and there in the upper and third lobes. Of the left lung there were slight adhesions, slight œdema with increased redness, and here and there hepatized nodules. The heart was healthy.—*Abdomen.* The stomach and intestines were distended with flatus. The liver was slightly enlarged, flabby, and of pale yellow colour. The kidneys were both enlarged; the right weighed seven ounces, the left six and a half. On removing the capsule from the right kidney the surface was observed to be mottled dark red and yellow. When incised the cortical substance was found of dark red colour, and encroached on the tubular portion, which was hardly distinguishable. The left kidney was externally mottled yellow and red; the cortical portion internally was of fatty appearance and yellow colour, and was considerably creased in size, with merely traces of the tubular portion seen here and there.

This case was treated and reported by Mr. S. Carvalho. The treatment consisted of quinine, diaphoretics, and stimulants. The wet sheet was twice used with removal of the febrile heat; but it seemed to me that there was reason for suspecting that it increased the internal congestions.

COMPLICATED REMITTENT FEVER.

Cerebral Complication.—It is of very great importance to inquire carefully into the pathology of this derangement. We have already seen that fully one-third of the fatal cases of remittent fever in European officers in the Bombay Presidency is of this nature; and, I believe, it will be found that the proportion of deaths from this cause is still greater in the remittents of sthenic European soldiers. But the cerebral affection is not in all cases to be attributed to malarious influence alone, for it is not to be doubted that, in a consider-

able proportion, it is in part due to exposure to the sun, and intemperance in drinking. The influence of mental anxiety ought also to be regarded, and, in natives, the habit of opium eating and ganja smoking must not be lost sight of.

While tracing the symptoms, we saw reason to suggest that they might depend on different conditions of the brain.

1st. Headache, flushing of the countenance, delirium occurring early in the attack, due to the direct influence of the causes, and not merely to that of frequently recurring exacerbations, depend, we may believe, for the most part, on active determination of blood to the membranes and substance of the brain, which, unless removed or prevented by treatment, is likely to terminate in varying degrees of serous effusion.

The following five cases are illustrative of cerebral symptoms appearing under these circumstances, and in four of them the influence of intemperance is apparent.

33. *Remittent Fever in a Man of Intemperate Habits.—Fatal with Convulsion, Coma, and Tumultuous Action of the Heart.—Considerable Effusion of Serum in the Head.—Streaked Redness and Softening of the Mucous Membrane of the Stomach.—Deep Red Tint of the Endocardium and Muscular Tissue of the Heart.*

James Riley, aged twenty, a boiler maker, of stout habit, and a few months resident in India, was admitted into the European General Hospital on the 2nd of July, 1838, affected with mild febrile symptoms. He stated, that for several days previously, he had suffered from a sense of oppression of the chest, which he had attributed to cold, but which did not prevent him from following his occupation of boiler maker. It was subsequently ascertained that he was a man of intemperate habits, and that he had been drinking to excess, before his present illness. On the morning of the 3rd, after a restless

night, the skin was warm and soft; pulse soft and of natural frequency; tongue slightly furred in streaks; thirst considerable; no uneasiness of the chest or fulness of abdomen. About six P.M. there was tenderness of the epigastrium; pulse frequent, hard, and sharp; manner excited; skin hot. He was bled, but fainted after the loss of sixteen ounces of blood. Ten grains of calomel with quarter of a grain of tartar emetic and a similar quantity of opium, were given. During the night the bowels were frequently moved; the evacuations were green and watery. On the morning of the 4th the skin was warm and soft; pulse eighty and firm; tongue moist and little furred; no excitement of manner. Five grains of calomel and twelve grains of Dover's powder were given. At the evening visit he felt better; the bowels had been twice moved, and the evacuations were dark and bilious. He was ordered a warm bath and a powder of chalk, and mercury with Dover's powder. The night was passed without sleep; skin cool. Cold effusion was used, and he took during the daytime two doses of antimonial mixture with one drachm of tincture of opium. Sleep did not result; and after the evening visit the cold effusion was again used, and a draught with one drachm and a half of tincture of opium was given. He slept for several hours, but on the morning of the 6th he continued nervous and agitated, and the action of the heart and of the carotids was strong. He was directed to be cupped on the cardiac region; but whilst the operation was being performed he was seized with convulsions, and died comatose after about an hour.

Inspection six hours after death.—Much of the external integuments was of purple tint.—*Head.* There was considerable effusion of serum at the base of the skull and between the membranes of the brain.—*Chest.* There were old costal adhesions and considerable infiltration of the lungs. The lining membrane of the heart and also the muscular tissue were of a deep red tint. The valves were healthy.—*Abdomen.* The substance of the liver was paler than natural and variegated here and there with large spots of dark red. The mucous coat of the stomach was streaked dark red and softened. The spleen was soft and large and the kidneys were normal.

34. *Remittent Fever in a Man of Intemperate Habits.*—*Death by Coma.*—*Increased Vascularity of the Membranes of the Brain and considerable Effusion of Serum.*—*Softening and Vascularity of the Mucous*

Coat of the Stomach and Large Intestine.—Commencing Degeneration of the Kidneys.

The commander of a merchant brig, aged forty-seven, of intemperate habits, was brought to the European General Hospital on the 13th July, 1838. It was stated that he had been feverish for some days, and had been drinking to excess. On admission he laboured under mental illusions; but when his attention was kept fixed on one subject, he answered questions rationally regarding it. There was no tremor either of the hands or tongue. After cold affusion and a draught, with a drachm of tincture of opium and a third of a grain of tartar emetic, he became composed, but did not sleep. The tongue was clean, and the pulse frequent towards night. The bowels were freely moved, but the pulse became feeble, and stimulants were substituted for the antimonial; after the second dose, he slept several hours. On the morning of the 14th, the hands and tongue were tremulous; skin natural; pulse ninety-six, full and soft. Camphor mixture, with diffusible stimulants, was directed to be given every second hour. Towards noon, the skin became hot; the pulse increased in frequency; the tongue became dryish and more tremulous; the delirium and tremors increased. Twenty-four leeches were applied to the temples, and at 8 P.M. a blister to the back of the neck, and a draught with two drachms of tincture of opium was given. An hour afterwards he fell asleep. In the middle of the night the pulse became thready. He was roused with difficulty, then passed into complete coma, and died at 10 A.M. of the 15th.

Inspection five hours after death.—Head. There was much vascular congestion of the pia mater, with considerable effusion of serum between that membrane and the arachnoid, and also into the ventricles. — *Chest.* The lungs did not collapse. The heart was flabby, and filled with fluid blood. — *Abdomen.* The liver was of dark grey colour and softened; the mucous coat of the stomach and large intestines was vascular and softened. The spleen was enlarged, and reduced to a bloody pulp. In both kidneys the distinction between the tubular and cortical substance was ill defined.

35. *Remittent Fever.—Simulating Delirium Tremens.—Pia Mater very vascular, with Bullæ of Air between the Arachnoid and Pia Mater and in the Vessels.*

William —, aged twenty-nine, a Conductor in the Ordnance Department, of slight frame, and frequently affected

with febrile attacks, in which the head was more or less implicated. On the 11th May, 1839, he was admitted into the General Hospital, suffering from diarrhœa, for which chalk mixture and calomel with opium were given. On the morning of the 13th (new moon), his skin was hot; he was excited, talked incoherently, and had been walking about the ward a great part of the night; pulse frequent; tongue rather furred in the centre. Cold affusion was used, and antimonial mixture, with tincture of hyoscyamus, was directed every two hours. At the evening visit the skin continued hot, and he had not been asleep. The cold affusion was repeated; and calomel four grains, tart. antimon. quarter of a grain, opium two grains, were directed to be given at bedtime, and ol. ricini. four drachms the following morning. Towards midnight he became troublesome and excited, and the scalp was hot. Cold lotion was applied to the head, and a blister to the nucha. About 5 A.M. of the 14th, he became comatose, with sinking pulse and laboured respiration. Green-coloured dejections were passed in bed. He died at 8 A.M.*

Inspection five hours after death. — Examination of the head was only permitted. The vessels of the pia mater were generally turgid with dark-coloured blood to their minute ramifications; and there were bullæ of air here and there in the vessels, and also between the pia mater and arachnoid membrane. The sinuses were also filled with blood, which was coagulated in some of them. There was about half an ounce of serum in the ventricles, and an ounce at the base of the skull. The substance of the brain was natural, and did not present many bloody points.

36. *Remittent Fever proving fatal by Collapse and Coma at the Close of an Exacerbation. — No Serous Effusion in the Head. — Dotted Redness and Softening of the Mucous Membrane of the Stomach. — Enlargement of the Mucous Follicles of the Colon and of Peyer's Glands. — Lumbrici in the Small Intestine.*

George Castor, aged twenty, a seaman of stout habit, was admitted into the European General Hospital on the 23rd of

* In these three cases the influence of intemperate habits is well marked. In all the full opiate was injudiciously given. In the two first the remissions were well marked, but no advantage was taken of them in the treatment.

June, 1838. He stated that he had been ill with fever for five days; during which time his head had been painful, and he had suffered from occasional vomiting. On admission his manner was sluggish, his skin hot; pulse 120, full, but compressible; tongue furred and expanded. Six dozen leeches were applied to the temples, and pills of extract of colocynth, calomel, and tartar emetic were given. The following day (24th) the head, though relieved, was still uneasy about the temples. The skin was cool, and moist, pulse 120 and feeble; the abdomen was soft and supple, and during the night there had been seven watery bilious evacuations. A blister was applied to the back of the neck, which rose well, but caused strangury. At the evening visit there was less sluggishness; the skin was cool; pulse 120, soft; the bowels had been freely moved, and the tongue was cleaner. Draughts with nitrous æther were ordered, and pills of blue pill and ipecacuanha. The night was passed without sleep, and on the following morning (25th) questions were answered freely, but giddiness was complained of. There was also uneasiness across the umbilicus, and there had been several ineffectual calls to stool; thirst moderate; tongue more furred, and expanded. Compound powder of jalap was given with æther and camphor mixture. At the evening visit it was reported that he had slept; the skin was cool and moist, and no medicine was given. During the early part of the succeeding night he rested well, but towards morning there was return of headache, rather a sense of giddiness than of pain, and increased by motion; there was slight intolerance of light, with flushing of the countenance. The skin was cool but dry; pulse 100, soft and of good strength; bowels freely opened: the tongue less furred but somewhat florid at the edges. Six dozen leeches were applied to the temples, and a diaphoretic draught given every three hours. At the evening visit the head was easier; skin cool and moist. The succeeding night was passed without sleep, and at 3 P.M. of the 27th, there was a febrile exacerbation followed by much collapse in the night time. He became comatose and died at 7 A.M. of the 28th.

Inspection five hours after death.—*Head.* There was no increased vascularity of the membranes, or substance of the brain. There was about one drachm of serum in the left lateral ventricles, and about half an ounce at the base of the skull.—*Chest.* With the exception of some old costal adhesions, the thoracic viscera were healthy.—*Abdomen.* The liver was healthy and the gall-ducts free. The mucous lining of the

cardiac end of the stomach for a space larger than the hand, was of dark red colour, dotted, marbled, and its texture softened. Towards the pyloric end the colour was natural, but the tissue was softened. The small intestines were filled with lumbrici. The aggregated glands of Peyer were enlarged. The mucous coat of the cæcum and colon was of dark grey colour, and studded throughout with dark points (enlarged follicles).*

37. *Remittent Fever.—Drowsiness and Coma.—Considerable Quantity of Serum effused in the Head.—Vascularity and Thickening of the Mucous Membrane of the Stomach.*

Mary Anne Moor, aged forty-seven, a native of India, a fat corpulent woman of intemperate habits, was admitted into the European General Hospital, on the 8th October. She stated that she had suffered from fever for five or six days. The skin, on admission, was hot, but soft; pulse 112 of good strength. The abdomen was distended but without pain on firm pressure. On the 9th there was slight delirium, and her hands were tremulous. This state continued till the 11th, when she became drowsy, was roused with difficulty, and when so, moaned and muttered to herself. The tongue was dryish, and the central part furred. This state continued with little alteration—the skin was dry but not often above the natural temperature, the pulse frequent and becoming feebler—till the 15th, when the drowsiness had increased and on the morning of the 16th, had passed into coma. She died at ten, A.M. The treatment consisted in shaving the head, applying blisters to the nucha and scalp; free purging; the use of antimonials with small doses of tincture of opium. Quinine and calomel were used in combination, on occasions when there appeared a remission in the symptoms.

Inspection eight hours after death.—Head. There was a considerable quantity of serum effused between the layers of the arachnoid membrane, and into the ventricles. The brain was firm in substance.—*Abdomen.* The integuments were loaded with fat. The mucous coat of the stomach was thickened and vascular, with abrasions here and there.

* This case will be again alluded to as the single instance in my notes of head symptoms during life, without morbid appearances in the head after death. The treatment was defective in the neglect of quinine during the remissions. The appearance of the mucous lining of the large intestines indicated an undue use of irritants.

In describing the symptoms I stated that delirium with tendency to drowsiness, associated with signs of general collapse, and dependent on enfeebled nervous energy, was apt to come on early in fevers of a bad type, towards the end of a paroxysm. Head symptoms, very similar in character, sometimes occur after the fifth or sixth day, in cases in which the treatment of the remissions has been neglected, and that of the exacerbations has been injudiciously depressant.

In my notes on the cases of sick officers I observe several which seem to me to have been of this nature. The following may be received as an illustration. It is very important to bear this suggestion in mind, for it is a serious error to treat head symptoms thus arising, in the same manner as those of the early stages related to cerebral determination.

38. *Remittent Fever. — Coma from Exhaustion.*

* A gentleman in the public service became affected with febrile symptoms at Tauna on the 4th of September. No treatment was adopted. He went to Bombay, and remained there also without treatment, and experiencing febrile accessions till the 8th, when he returned to Tauna. He had rigors in the boat two hours before landing. On the morning of the 9th there was remission, and towards evening an exacerbation, for which an emetic and a purgative of calomel were given. On the 10th at 4 P.M. there was again an exacerbation, with sense of swimming in the head. Eight dozen leeches were applied to the temples. There were rigors at midnight, followed by coma and death at 8 A.M. of the 11th.

2nd. Cerebral symptoms, depending on inflammatory action of the membranes or substance of the brain, also occur in the course of remittent fever; but this event is rare compared with determination of blood. Among the fatal cases of sick officers I find only two of this nature. The following four illustrations are taken from my own observations.

39. *Remittent Fever.*—*Death by Convulsion and Coma.*
—*Vascular Congestion of the Vessels of the Pia Mater.*
—*Rosy Tint of the Substance of the Brain.*—*One Ounce of Serum at the Base of the Skull.*—*The Heart dilated and its Tissue Pale and Flabby.*—*Partial Redness, Thinning, and Softening of the Mucous Coat of the Stomach.*—*Peyer's Glands enlarged.*—*The Spleen enlarged and softened, and the Kidneys congested.*

Laurence Fearon, aged thirty-seven, an engineer of the steam department, and of full habit. During the four months of his residence in Bombay, he had been several times in hospital ill with fever, attended with gastric irritability. He was again admitted on the evening of the 2nd of September, 1839, having been ill with fever for about a week before admission. There was headache, with pain at the margin of the right false ribs; the bowels were relaxed; thirst great; skin soft, but above the natural temperature; pulse 108, full. He was directed to be bled to sixteen ounces; the head to be shaved and cold cloths applied; a warm bath was ordered at bedtime, and six grains of calomel and one grain of opium with ipecacuanha. On the morning of the 3rd there was no headache, and the epigastric uneasiness was removed; the skin was covered with moisture, but the bowels had not been opened. An ounce of castor oil was given. At the evening visit the pulse was ninety-six; there was no local pain; the bowels had been moved and the evacuations were bilious. The warm bath was directed at bedtime, and two grains of quinine were ordered to be taken early the following morning, and to be repeated every second hour for three doses. On the morning of the 4th general uneasiness of the upper part of the head was complained of; the pulse was upwards of 100; urine scanty. The quinine was directed to be omitted, and a draught of rhubarb and magnesia with colchicum wine to be given. At the evening visit the bowels had not been moved; at noon there had been rigors followed by pyrexia; the pulse was 116; the epigastrium was tender; the pupils were slightly dilated; there was some confusion of thought and slight tremors of the muscles. A purgative enema was exhibited; thirty leeches were applied to the temples, and fifty to the hypochondrium; and a blister was placed between the scapulæ. At midnight he had a convulsive fit; and when seen about

twenty minutes afterwards, was found with dilated pupils, breathing heavily, and passing into coma; the skin was covered with sweat; the pulse was full; the bowels had not been opened. He was cupped on the temples to ten ounces. A purgative enema with ol. terebinth. an ounce and a half was exhibited. Fifteen grains of calomel were given, and, after two hours, four ounces of haust. cathart. were directed to be taken. About an hour afterwards he was again much convulsed; the bowels had not been moved. A foot-bath at temp. 110° was ordered, and a blister to the epigastrium. At 2 A.M. he had passed into perfect coma, with stertorous breathing and convulsive movement of the arms and legs; surface hot. He died at 1 P.M. of the 5th.

Inspection twenty-three hours after death. — Body stout. — *Head.* There was a general bright red blush of the smaller vascular ramifications of the pia mater. The medullary substance, when incised, presented a pale rosy tint, and the cortical substance had also a reddish colour. There was about an ounce of serum at the base of the skull, but none elsewhere. — *Chest.* The lungs were emphysematous on their anterior aspect, and old cellular adhesions connected them to the costal pleuræ; there was very little congestion of their posterior parts. The heart was about twice the size of the fist; all its cavities were dilated, but chiefly the left ventricle, the walls of which were, perhaps, less than natural in thickness. The muscular tissue of the heart was pale and flabby; there was a fibrinous polypus in the left ventricle, but the cavity was not distended with blood. The lining membrane of the commencement of the aorta had a deep rosy colour (imbibition), and the surface was roughened by firm cartilaginous deposit. The aortic and the auriculo-ventricular valves were undiseased. — *Abdomen.* The stomach was dilated. The transverse diameter of the liver was considerably increased, so that reaching about two inches below the right false ribs, it extended to the left of the mesial line about four inches; it was tied to the diaphragm and sides by old cellular adhesions, was natural in texture but of greenish olive tint. The stomach contained about half a pint of dark green fluid. At the cardiac end there was a dark red patch and the mucous coat was thinned and pulpy; elsewhere the coat was of natural thickness, of leaden grey colour, but generally somewhat softer than natural. The small intestines were healthy in their tissues. At the end of the ileum the isolated glands were prominent. The mucous coat of the colon was of leaden grey tint, but of natural texture, with the follicles

not distinguishable. The spleen was considerably enlarged and softened. The kidneys were considerably congested, chiefly in their tubular part.

40. *Remittent Fever.—Meningitis.—Effusion of Serum in the Cavity of the Arachnoid and sub-Arachnoid Space.—Opacity and Thickening of the Arachnoid Membrane.*

William Woodward, aged seven, an Indo-Briton, was admitted into the sick-ward of the Byculla Schools on the 6th June, 1838. He was affected with febrile symptoms, which did not attract much attention till the 10th, when there was increased heat of skin, and frequency of pulse, with a tendency to drowsiness. Twenty-four leeches were applied to the temples, a blister to the nucha, and the bowels were freely acted upon. During the two succeeding days the skin continued hot, the pulse was about 120, and the drowsiness remained unabated. An attempt was made to affect the system with mercury; the bowels were kept free, and a blister was applied to the scalp. On the 13th, there was frequent screaming and moaning; there was strabismus with dilated pupils, and the head was frequently raised from the pillow and moved slowly about, as if in search of some object. The symptoms progressed; the pulse continued frequent, and became feeble; the coma became more complete; and death resulted at midnight of the 14th.

Inspection twelve hours after death.—Head. There was more than usual vascularity of the pia mater, where it dips down between the convolutions of the brain. There was a considerable quantity of serum effused between the arachnoid membrane and the pia mater, chiefly on the superior and posterior parts of the hemispheres; and in these situations the arachnoid membrane was milky, firm, and thickened. There were adhesions between the arachnoid membrane and the falx, caused by small granules of lymph. There was also a considerable quantity of serum at the base of the skull, and more than the natural quantity in the ventricles. There were bloody points apparent on slicing the substance of the brain. The viscera of the thorax and abdomen were healthy.

41. *Remittent Fever admitted after a Week's Illness.—Head Symptoms chiefly marked by Unsteadiness of*

Manner, and latterly Drowsiness. — Arachnoid Membrane opaque and thickened. — Increased Serous Effusion.

William Subbeter, aged sixteen, after having been ill for a week with headache and fever, was admitted into the General Hospital on the 9th May, 1842. There was heat of skin, flushed countenance, undecided manner. The tongue was yellow in the centre and florid at the tip; and the epigastrium was tender. Twenty-four leeches were applied to the temples, and thirty-six to the epigastrium; the head was shaved, cold applications were used, and sponging of the general surface had recourse to; effervescing draughts were exhibited from time to time, and some blue pill and ipecacuanha were given at bedtime. On the morning of the 10th there was still some heat and dryness of skin, but in other respects the symptoms were improved. In the evening there was a distinct exacerbation of the febrile symptoms. Sponging, cold applications, and effervescing draughts were continued, and the blue pill and ipecacuanha were repeated. On the morning of the 11th, still pyrexia; pulse ninety-two; tongue slimy and tremulous; bowels rather relaxed; manner unsteady. The remedies were continued, with addition of spirit. æther. nit. to the effervescing draughts, and the application of a blister to the nucha. On the 12th, febrile heat and other symptoms continued, accompanied with slight subsultus. Camphor mixture c. spirit. æther. nit. was given every third hour; and chicken soup was ordered. On the 13th, pulse 104; four dejections quite feculent; in other respects as on the 12th. Sago and milk morning and evening, and chicken soup for dinner, and the camphor mixture continued. On the morning of the 14th there was a distinct remission; and quinine and blue pill were ordered every second hour, with effervescing draughts. The evening accession was milder. On the 15th and 16th, the febrile exacerbation seemed to be somewhat checked under the use of the quinine; but on the 17th the symptoms were all again aggravated, generally in the twenty-four hours, with three or four dejections. On the 18th he vomited several times, and passed three copious watery evacuations, followed by sunken features, feeble pulse, and damp skin. These symptoms continued, with the addition of drowsiness on the 21st; and death took place on the morning of the 24th.

Inspection eight hours after death. — Head. The arachnoid membrane over the convex surface of the brain was opaque

and thickened with, here and there, small rounded granules of lymph, the size of a pin's head. There was about an ounce of serum in the lateral ventricles; and about an ounce and a half at the base of the skull. The substance of the brain was firm. — *Chest.* Old adhesions connected the right lung to the pleura; but the substance of the lungs was crepitating. Heart healthy. — *Abdomen.* The liver was healthy. The colon distended, but its mucous coat healthy. The mucous coat of the stomach was of dark grey tint with dark red streaks, but was sound in texture.

42. *Remittent Fever admitted in an advanced Stage. — Death by Coma. — Extensive Lymph and Serous Effusion in the sub-Arachnoid Space. — Hepatization of both Lungs.*

Bappoo Mahomed, forty years of age, a Mussulman sailor, was admitted, after twenty days' illness with fever, on the 10th September, 1849, into the clinical ward of the Jamsetjee Jejeebhoy Hospital. There was trembling of the whole body and frequent twitching of the muscles of the forearms. He was affected with low muttering, delirium, and drowsiness; the skin was above the natural temperature and dry; the pulse was frequent and feeble; he could not protrude the tongue; the respiration was short and hurried. Anteriorly and laterally on the right side of the chest, there was dulness on percussion and absence of breath sounds. He died on the afternoon of the 11th.

Inspection seventeen hours after death. — Between the pia mater and the arachnoid over the entire convex surface of both hemispheres of the brain, but greatest in degree on the left side and depending parts, there was effusion of lymph and serum, to such extent as to give a yellow opaque appearance to the surface. Similar effusion also existed over the cerebellum and in a slight degree over the pons varolii and medulla oblongata, but not elsewhere at the base of the brain. The surface of the convolutions of the brain was of natural appearance and consistence. The substance of the brain elsewhere was also quite healthy. There were from six drachms to an ounce of serous fluid in the lateral ventricles, and about two ounces at the base of the skull.

The whole of the upper lobe of the right lung, except about half an inch of the apex, and also the whole of the middle lobe, were in a state of red hepatization, having, when incised, a granular appearance with considerable oozing of frothy serum on

pressure, and readily breaking down under the finger. The rest of the lung was crepitating. The free anterior border of the lobe of the left lung, extending for about three inches, was in a state of red induration; the rest was healthy. The heart and pericardium were healthy. The large and small intestines were distended with air. The liver was of natural size and consistence, but was congested. The kidneys were not examined.

3rd. When delirium, drowsiness, and coma come on in the more advanced stages of remittent fever associated with adynamic phenomena, then more or less increased serous effusion in the cavity of the cranium, unattended, however, with any great degree of vascular turgescence, is generally found after death. But it is very doubtful, for reasons presently to be particularly alluded to, whether, in a large majority of cases of this kind, there is any relation between the head symptoms and the increased effusion. The following are cases of adynamic remittent fatal with coma.

43. *Remittent Fever with Adynamic Symptoms. — Slight Vascularity of the Membranes of the Brain with Air in the Vessels and beneath the Arachnoid. — Turgescence and Ulceration of Peyer's Glands at the End of the Ileum.*

John Steptoe, private of Her Majesty's 15th Hussars, two months resident in Bombay, was admitted into hospital on the 6th February, 1840, and died on the 15th. He had been ill before admission. The following were the leading features of the disease. Pyrexia almost constant with an occasional remission in the middle of the day; hands tremulous; pulse from 100 to 120, compressible; tongue coated and dry in the centre, florid at the tip; sordes about the teeth; thirst; more or less diarrhoea. On one occasion pain between the right ribs and crest of the os ilium. The eyes were suffused; at first there was wandering delirium at nights, and on the latter days drowsiness not amounting to coma.

Inspection. — Head. — There was moderate turgescence of the vessels of the membranes of the brain, with numerous glo-

bules of air in the vessels or underneath the arachnoid. On incising the brain, there were more than the usual number of bloody points. There was an ounce of serum at the base of the skull. — *Abdomen.* The liver was quite healthy. The mucous coat of the cardiac end of the stomach was dotted dark red, but without softening. The mucous coat of the end of the ileum was of dark red colour; the patches of Peyer's glands were red, turgid, and prominent, and several of them were in different stages of ulceration. Close to the ileo-colic valve there was an ulcerated patch the size of a rupee. There was dark red colour of the mucous coat of the cœcum, but no ulceration. The rest of the large intestine was healthy.

44. *Remittent Fever.* — *Symptoms Adynamic and badly-developed.* — *Serous Effusion and slight Vascular Congestion in the Head, also Air in the Vessels.* — *The Colon distended and in part displaced.*

Neil Wallace, aged twenty-eight, seaman of the ship Samuel, was admitted into the European General Hospital, on the 21st October, 1841. He stated that for a fortnight past he had experienced a sense of weight at the centre of the chest, for which he had taken much medicine. On admission he inspired freely and there was neither pain of chest nor cough; the skin was dry and above the natural temperature; the pulse was frequent and of moderate strength; and the tongue was florid. It was supposed that he had been living freely for some days. On the 22nd and 23rd the abdomen was full, the pulse from eighty-eight to ninety-two and feeble; and on the latter day his manner and expression were dull and heavy. He was blistered on the nucha, a full dose of calomel (ten grains) was given, followed by castor oil, and on the morning of the 24th he was somewhat alert. The bowels had been opened twice; the skin was moist; the pulse ninety-two and feeble. Port wine and sago were given. At the evening visit, the pulse still feeble, but there was febrile heat of skin; the tongue was florid, and the sluggishness of manner had increased. The head was shaved, cold cloths applied, and a nitro-muriatic acid foot-bath was used. He continued to lose ground; there was generally a morning remission and evening exacerbation of fever; the pulse became feebler; the hands tremulous and with subsultus tendinum; the tongue became dry; the drowsiness increased, and at last passed almost into complete coma. He died on the 31st October.

Inspection fourteen hours after death.—*Head.* A thin veil of serum was effused between the convolutions on the convex surface of the brain. The small vessels of the pia mater were in parts injected with blood, and the large ramifications contained air. No increased quantity of serum in the ventricles or at the base of the skull. — *Chest.* The lungs did not collapse freely. Heart healthy.—*Abdomen.* The liver was healthy. The colon was much distended with air, and the sigmoid flexure, thrown across the small intestines, was applied to the inner aspect of the ascending colon. The large intestine was sound in texture.

When, as in the first* set of cases, we find head symptoms coming on early in the disease, and after death more or less vascular turgescence, with increased serous effusion in the cranium; or, as in the second set, head symptoms with opacity of the membranes, or with lymph and serous exudations, we need not hesitate in relating the morbid appearances found after death, to the symptoms present during life. .

But when, as in the last set of cases, the head symptoms which indicate failing function of the brain have been coincident with failure of other vital actions, then it is very doubtful whether a relation between these symptoms, and increased cranial serous effusion, can be viewed as a probable inference. This so-called morbid appearance may, in adynamic states, be otherwise explained.

The reports of 205 fatal cases of disease observed by me in the European General Hospital at Bombay, are now before me, and on carefully examining them I find, that while on the one hand, of 59 cases in which head symptoms during life were well marked, there is only one in which there was an absence of morbid appearances after death †, there are, on the other hand, 50

* With one exception. No. 36.

† It is No. 36., already alluded to on this point.

cases, in which there were not head symptoms present during life, but in which appearances in the contents of the cranium, generally considered morbid, were observed after death.

Of these 50 cases, the ages of the individuals were as follows:—

Between 10 and 15 years, inclusive	-	-	2
16 „ 20 „	-	-	4
21 „ 25 „	-	-	14
26 „ 30 „	-	-	7
31 „ 35 „	-	-	7
36 „ 40 „	-	-	2
41 „ 50 „	-	-	7
51 „ 60 „	-	-	4
61 „ 70 „	-	-	1
Ages not given	-	-	2
			<hr/>
			50

The deaths took place in the following months:—

January	-	-	4	July	-	-	3
February	-	-	5	August	-	-	4
March	-	-	6	September	-	-	4
April	-	-	5	October	-	-	1
May	-	-	6	November	-	-	2
June	-	-	2	December	-	-	4
			<hr/>				<hr/>
			28				18
Months not stated	-	-	-	-	-	-	4

Of these 50 cases the deaths were occasioned by the following diseases:—

Tubercular Phthisis	-	-	7
Pleuritis	-	-	1
Disease of the Heart	-	-	1
Hepatic abscess	-	-	8
Dysentery	-	-	11
Peritonitis	-	-	4
Scurvy	-	-	3
Spasmodic Cholera	-	-	14
Rupture of the Spleen	-	-	1
			<hr/>
			50

In 4 of the 50 cases, the morbid appearance consisted of increased vascularity of the membranes of the brain. These were all cases of epidemic cholera.

In 19 cases, both increased vascularity and increased serous effusion within the cranium were present. Death took place from the following diseases.

Epidemic Cholera	-	-	9
Disease of the Heart	-	-	1
Dysentery	-	-	4
Peritonitis	-	-	2
Hepatic abscess	-	-	2
Gastro-enteritis	-	-	1
			<hr/>
			19

In 27 cases, there was increased serous effusion within the cranium, without increased vascularity.

Death in these instances was caused by the following diseases:—

Tubercular Phthisis	-	-	7
Hepatic abscess	-	-	6
Dysentery	-	-	6
Peritonitis	-	-	2
Epidemic Cholera	-	-	1
Pleuritis	-	-	1
Rupture of the Spleen	-	-	1
Scurvy	-	-	2
Rheumatism (Scorbutic)	-	-	1
			<hr/>
			27

In regard to the facts which have just been stated, it may be observed.

1st. They do not show any relation between absence of head symptoms, associated with increased vascularity and serous effusion within the cranium, and particular age or season.

2nd. They show a relation between the absence of head symptoms, associated with increased vascularity

with or without increased serous effusion within the cranium, and a state of general venous congestion, dependent upon a feebly acting heart.

3rd. They show a relation between absence of head symptoms associated with increased serous effusion without increased vascularity within the cranium, and death taking place by gradual asthenia. When death takes place after this manner, serous transudations, from serous linings and into areolar tissue, are familiar facts. The cerebral serous effusion, to which allusion is now made, is an event analogous to these.

4th. The increased vascularity in these cases is that of congestion, not of inflammation. The increased serous effusion is not the result of inflammation, but of congestion, and of those conditions of the tissue and of the *blood* which are believed to favour serous transudation.

They confirm therefore the opinion of Dr. Abercrombie,—that the head symptoms of acute hydrocephalus do not depend upon the presence of serous effusion within the cranium, so much as on the deranged capillary circulation (inflammation) of which the serous effusion is the consequence.

The serous effusion in the cases of which I now treat was not the result of *this* deranged state of the capillary circulation (inflammation); hence, though present within the cranium, head symptoms were not necessarily induced by it.

5th. It should be borne in mind that increased vascularity and serous effusion within the cranium, found after death, does not necessarily prove their presence there during life. They may have taken place in some instances during the agony of death, or after the fatal event.

6th. These facts, which show want of relation between increased vascularity and serous effusion within the cranium found after death, and the proximate cause of the fatal result, should be remembered in judicial inquiries on bodies found dead, and of the previous history of which nothing is known. *In such cases, if there be present within the cranium only increased vascularity or increased serous effusion separately or associated together, we can never be justified in attributing death to these conditions.* These statements have been entered into not only from their relation to the similar after-death appearances in fatal cases of adynamic remittent fever, but also because they tend to confirm observations of a like tenor to be found in the writings of Louis*, Abercrombie†, and Bright.‡ Facts of this kind are of much importance in reference to the Pathology of the Brain.

Gastric Irritability.—I pass over the occurrence of occasional vomiting as one of the deranged actions of the febrile state, and here direct attention to those greater degrees of irritability of the stomach which depend upon local disease.

In the severe forms of remittent fever, in sthenic Europeans, cerebral symptoms and gastric irritability are very frequently associated together. This was the case in the remittent fevers from which Her Majesty's Fourth Light Dragoons suffered so much at Kaira. In these it was very common to find after death, increased vascularity of the vessels of the brain, with some degree of increased serous effusion, and at the same time a deeply reddened state of the mucous membrane of the stomach, and sometimes of the intestinal canal. It is very pro-

* Researches on Phthisis.

† On Diseases of the Brain.

‡ Reports of Medical Cases.

bable that the deranged state of the capillary circulation was the same in both organs,—not inflammatory, but rather of the character of passive congestion or active determination. In other instances the gastric will be the principal complication. This occurred in 6 of the 90 fatal cases of officers formerly alluded to.

As respects the pathology of that form of remittent fever to which the term *bilious* has been applied, I cannot view it in any other light than as a coincidence of the state I have just been describing, and the presence of a considerable quantity of bile in the gall-bladder and in the biliary ducts,—hence the notable admixture of bile in the ejected matters. The term has probably been too frequently, and too vaguely, used by writers on tropical fevers. I shall not again employ it.*

Irritability of stomach also occurs in the course of remittent fever, both in sthenic and asthenic constitutions, developing itself somewhat more gradually, generally with distinct epigastric uneasiness, and a tongue more or less florid at the tip and edges, and is dependent on inflammatory action of the mucous membrane. Evidence of this will be found in cases 28, 29, 31. 39—41. quoted in this chapter.

On referring to 114 selected clinical cases of natives, I find that gastric irritability is noted of 2 only.

Habits of intemperance as an auxiliary cause of head symptoms have already been adverted to. The same observation is still more applicable to irritability of sto-

* I am aware that there may also coexist a similarly deranged capillary condition of the liver ; but that this, during the presence of the febrile state, leads to increased hepatic secretion, is very doubtful. It is more likely that the secretion is antecedent and in excess in the biliary passages and reservoirs at the onset of the fever.

mach, whether of the nature first noticed, or that depending on gastric inflammation.

When treating of intermittent fever, I expressed my conviction that irritability of stomach was not unfrequently caused and kept up in the quotidian type, by the unnecessary use of calomel and purgatives given during the hot stage. This is still more true of remittent fever, because in it these means have been abused in still greater degree. The practitioner who uses these medicines guardedly, with a clear apprehension of their evils as well as of their advantages, will find vomiting a less frequent symptom of remittent fever than it has usually been represented to be. This impression left on my mind from a careful review of the whole subject, is sustained by the fact that in 357 cases of fever, intermittent and remittent, treated by me in natives in the clinical ward, gastric irritability was present only in 6.

Affection of the Bowels.—The occurrence of dysenteric symptoms in the early stages of remittent fever in sthenic constitutions has been a rare event in my experience. Nor have I met with it frequently in the more advanced stages, or even in fever in asthenic states. From the writings of Mr. Twining, and more lately from those of Mr. Hare*, we may learn that this complication has been more frequently observed in Bengal, and that the type of the fever has generally tended to be congestive, or adynamic, and the dysentery to be hæmorrhagic in character. It may be also concluded from Haspel's work on the diseases of Algeria, and Bleeker's report on the dysentery of Batavia†, that the coexistence of dysentery and of remit-

* Indian Annals of Medical Science, No. ii.

† Ibid., No. i.

tent fever is not unusual in these countries. Indeed, we may probably look for it in localities where the season of much malarious generation is coincident with considerable atmospheric moisture and vicissitude. I shall, in connexion with the subject of dysentery, have to express my dissent from the opinion of those who regard malaria as an *exciting cause* of that disease.

Diarrhœa has been, according to my observation, a more frequent complication of remittent fever, and may coexist with gastric irritability. Yet compared with others it is not common. I find that it was present in only 6 of 114 clinical cases in natives.

In fatal cases in which increased discharges from the bowels have been present during life, we may expect to find evidences of inflammatory action having existed in the mucous membrane of the end of the ileum or of the large intestine. Cases 28. 36. 43. illustrate this observation, and the two following are further confirmatory of it.

45. *Remittent Fever, with Head and Gastro-enteritic Symptoms; two or three ounces of Serum in the Cranium.—Firm Granular Exudation on the mucous Surface of the Colon. — Dark Redness of the End of the Ileum. — The Subject of a large Hydrocele.*

John Daniel, aged fifty, a person of colour, born in Ceylon, of feeble and emaciated habit, was sent to the hospital on the 5th September, 1839, having been found in a state of destitution on the road. He was unable to give any account of himself, his tongue was dry and covered with a yellow crust; pulse 116; skin not of increased temperature. He was also the subject of a large hydrocele. He died on the 16th September. The leading symptoms during his residence in hospital were frequent hiccup and incoherent muttering; pulse generally about 100 and feeble; tongue crusted in the centre, and florid at the tip; the skin generally not above the natural temperature; two or three evacuations daily, passed in bed,

feculent and containing lumbrici; little food taken. The treatment consisted of quinine with small doses of calomel, a blister to the epigastrium; wine and light nourishing food; on one occasion an enema with ol. terebinth.

Inspection eight hours after death. — Body much emaciated; the skin and fibrous tissues deeply tinged yellow. — *Head.* The convex surface of the brain was partially veiled with serum; and there were between two and three ounces of it effused at the base of the skull. — *Chest.* Old adhesions connected both lungs to the costal pleuræ; but the substance of the lungs was healthy. In both sides of the heart there were fibrinous polypi, entwining round the cords of the auriculo-ventricular valves. — *Abdomen.* The intestines externally had a dark greenish tint. The liver was of dark green colour and the gall-bladder was nearly empty. The stomach was contracted, and much of its mucous lining was mammillated, and thickened,—this was chiefly in the body and at the pyloric end. The mucous coat of the colon had a general dark leaden grey tint, and in the cœcum, the descending colon, and the rectum there were extensive patches of lymph effused in detached pieces, presenting a roughened surface like shagreen; this lymph adhered firmly to the mucous coat which underneath presented a dark dotted red appearance, was firm and somewhat thickened, with the submucous tissue more fibrous than is natural. At the end of the ileum there was much dark vascularity of the mucous coat. There was one lumbricus in the colon and one in that part of the small intestine which was opened. The kidneys were healthy. There were about ten pints of dark red turbid fluid, in the tunica vaginalis which was thickened, cartilaginous, and presented an inner surface of dark red tint roughened by closely adherent fragments of very firm lymph.

46. *Remittent Fever.* — *Peyer's Glands enlarged and ulcerated.* — *Head Symptoms with moderate Turgescence of the Vessels.*

Caroline Smith, an Indo-Briton, aged nine. On the 7th July, 1839, after having been in the sick ward for two or three days, with mild febrile symptoms, was observed to be affected with slight drowsiness and heat of head, for which twelve leeches were applied to the temples and the bowels freely acted on with calomel, followed by senna mixture. On the 8th there was still heat of skin and of the head. The head

was shaved and cold applications used. On the 9th she seemed drowsy and the scalp was hot and the pulse frequent. The tongue was more florid than natural, she had vomited several times, and the bowels were open. Six leeches were applied to the temples and six to the epigastrium; cold applications were continued to the head and a blister was applied to the back of the neck, and effervescing draughts were given every fourth hour. She passed an uncomfortable night with frequent moaning. On the morning of the 10th there was a good deal of heat of scalp, and the general surface was above the natural temperature. The pupils contracted freely, but she lay with her eyes shut as if annoyed by the light. There was tenderness on pressure of the epigastrium; the bowels had been opened during the night. Six leeches were applied to the margin of the right ribs, cold wash continued to the head, and an enema directed at noon. At the evening visit she was reported to have been cool and more lively at noon; but there was again a febrile exacerbation; bowels moved once. Calomel grs. iii. pulv. jalap grs. vi. to be taken at bedtime. She vomited the powder but passed the night quietly. On the morning of the 11th, bowels not opened; abdomen full; tongue pretty clean, skin cool but dry; pulse rather frequent; she was still sluggish. A domestic enema, with turpentine oil, was directed to be used, and the following pills prescribed: — quinine sulph. and pil. hydrarg. aa. grs. iv. ipecac. gr. iss. tere bene ft. pil. iii., one to be taken every second hour, for four doses, should there be no fever; chicken soup. She vomited several times during the day, and at the evening visit the pulse was 104; there was very slight heat of skin and there was less drowsiness; abdomen still full; the bowels had been opened by the enema but not otherwise; tongue not furred, and tolerably moist. Repet. enema c. ol. terebinth, and give an effervescing draught every fourth hour. During the night time, she vomited frequently; and was purged four or five times. Sinapisms were applied to the stomach, and a powder with hydrarg. c. cret. given. At half-past seven, A.M., of the 12th, the skin was cold and the pulse thready; tongue not coated. Recipe quinine grs. vi. opii. gr. half, confect. aromat. q. s. at ft. pil. iv. one to be given every third hour; and sago with wine or brandy occasionally. She vomited the sago and brandy; there was no recurrence of purging. At noon the pulse was hardly perceptible. Liquor lyttæ was applied to the epigastrium; and the remedies continued. The vomiting of ingesta continued, and she died about ten, P.M.

Inspection ten hours after death. — *Head.* There was moderate vascular turgescence of the membranes of the brain, and dotted points on incising its substance; there was about an ounce and a half of serum at the base of the skull. — *Chest.* The lungs, partially collapsed, were somewhat emphysematous; there was no congestion of their posterior part. — *Abdomen.* The liver was healthy. The stomach was contracted and its mucous coat normal. At the end of the ileum the glands of Peyer were distinct, and there were three or four round ulcers, each the size of a split pea; cicatrization had commenced. In the colon the follicles were distinct but the tunic healthy. The mesenteric glands ranged in size from a pea to a horse bean, but were not tubercular.

The observation made in reference to affection of the bowels in intermittent fever, viz. that its frequency will be found to bear relation to the injudicious use of purgatives, is equally applicable to remittent fever.

Hepatic Affections. — Hepatitis has been, in my field of practice, an unusual feature of remittent fever. It was so in the European General Hospital, and in 138 cases of remittent fever in European officers, it is noted only of 7 cases, and of these 5 were recoveries. In 114 clinical cases in natives, hepatitis was present in 3. The liver may be enlarged in the early stages of remittent fever from congestion, but my notes do not supply me with much information on this point. Hepatic enlargement may also be an occasional sequence of remittent fever, just as has been fully explained, frequently takes place in intermittent fever.

Splenic Enlargement is noticed in 20 of the clinical cases, and when occurring may generally be viewed as indicating that the individuals thus affected had suffered from former attacks of intermittent fever. Splenic enlargement has been already so fully considered in connexion with intermittent fever, that further notice under the present head may be readily dispensed with.

Jaundice.—This complication was present in 28 of my selected clinical cases of natives, and of these 10 proved fatal. Of the 90 fatal cases of remittent fever in European officers 7 were of this nature. I have* formerly remarked that jaundice was not a frequent occurrence in this type of fever, as observed in the European General Hospital at Bombay, but that a season seldom passed without a few instances being met with.

The frequency of this complication, however, evidently varies in different years. In the clinical ward it was more common in 1848 than in any of the five following years.

The pathology of jaundice is important, and as yet not well understood. I shall therefore quote all the fatal cases, ten in number, of which I have full notes. When compared with the recoveries, it may be observed that the average duration of illness of the fatal cases on admission has been three days longer, being about eleven days, whereas that of the recovered cases has been about eight days.

It was the opinion of Mr. Twining that the occurrence of jaundice was caused, in some cases, by the mechanical pressure of enlarged lymphatic glands situated near the entrance of the common biliary duct into the duodenum. In my researches on this subject I have had in view the confirmation, or not, of this opinion. It will, therefore, be found that the state of these glands is generally noticed in the after-death reports of the cases. In examining the cases which are presently to be narrated it will be observed that the lymphatic glands in the course of the ducts were believed to

* Transactions, Medical and Physical Society of Bombay, No. vi. p. 189.

be enlarged in 6 of the 10 cases; but, with one exception, there was no reason to think that the enlargement had made mechanical pressure on the duct. In the exceptional case (50.) the pressure was rather from the head of the pancreas than from the enlarged glands. In one of the 6 cases the hepatic and common ducts were obstructed by an impacted lumbricus. In 2 of the 6 cases there was constriction of the cystic duct, but it was independent of glandular enlargement; in both the gall-bladder was full of bile.

In 6 of the 10 fatal cases there were appearances indicative of inflammation of the mucous membrane of the duodenum and of the stomach; and in 3 of these there were also enlarged lymphatic glands. In respect to the remaining 3, in 2 the glands were not enlarged, and in the third their state was not noted. Of the remaining 4 of the 10 fatal cases, in one the state of the duodenum was not noticed; in one there was obstruction of the ducts from a lumbricus; in one neither enlarged glands nor gastro-duodenitis were observed; in one there were enlarged glands and pancreas without gastro-duodenitis.

These data are not sufficient to justify a very positive opinion, but to my mind they are not confirmatory of Mr. Twining's views. When it is recollected that jaundice seldom comes on before the fifth day of the fever, and is almost invariably attended with tenderness below the margins of the seventh, eighth, and ninth right ribs, it may be suspected that its most important relation is to inflammation of the mucous membrane of the duodenum. This opinion is confirmed by the undoubted fact that remittent fever, complicated with jaundice, is best treated by the moderate use of leeches, small blisters, mild alterative aperients, and quinine in

the remissions; and is sure to be aggravated by the injudicious use of calomel and of purgatives. The symptoms appear to point rather to the inflammatory condition of the duodenum than to that of the stomach, which seems generally to coexist, because vomiting is certainly very frequently absent.

These cases are not illustrative of the frequent dependence of jaundice on inflammation of the mucous lining of the ducts themselves; inflammation of this texture was not observed in any of them. They are defective in one respect. In only three of them was the state of the hepatic cells examined by the microscope; but in these the cells presented no abnormal appearance. None of the cases, however, were of the nature of the yellow atrophy of Rokitsansky, in which the head symptoms are prominent, and the course rapid, from probable direct destruction of the vitality of the hepatic cells by the influence of the morbid cause.*

47. *Remittent Fever with Jaundice.—Drowsiness.—Biliary Congestion of the Liver.—Enlarged Lymphatic Glands in the Course of the Common Duct.—Slight Dilatation of the Hepatic Duct.—Gastro-Duodenitis.—Granular Exudation on the Mucous Surface of the Ileum and Colon.—Nodules of Pulmonary Apoplexy; one softened into a Cavity.*

Nuthagee, a Hindoo labourer of twenty-five years of age, was admitted into hospital, after ten days' illness with fever, on the 14th of September, 1848. The pulse was feeble, the skin was coldish; the bowels relaxed; the tongue coated and slimy; hiccup was present, and the conjunctivæ were yellow. He was somewhat drowsy, but pointed to the right side as the

* I shall again return to the Pathology of Jaundice in connexion with the diseases of the liver.

seat of pain. The symptoms continued with little change till the 18th, when he became more drowsy and died, having expectorated some bloody serous fluid about ten hours before death. He was treated with quinine and Dover's powder, light nourishment and stimulants, and a blister was applied to the right side.

Inspection fourteen hours after death.—*Abdomen.* The liver, somewhat enlarged, was connected to the diaphragm by old adhesions; it was of olive-greenish tint when incised. The gall-bladder was full, but not distended. Just beyond the junction of the cystic and hepatic ducts, there commenced a chain of lymphatic glands, which surrounded and accompanied the common duct to its point of entrance into the duodenum. The diameter of the chain of glands was equal to the barrel of a swan's quill. The hepatic duct was somewhat dilated. There was no redness of the mucous lining of the biliary ducts. The mucous surface of the duodenum presented a surface of bright red patches, and contained adhesive mucus, but the membrane was not softened. Similar patches were observed at the commencement of the jejunum. The end of the ileum, for about two feet, and the cæcum, were laid open. The inner surface of the ileum was bright red in patches, which followed the transverse folds of the membrane, and were covered with granular lymph. In scraping off the lymph no softening of the membrane was found. Similar red patches, but without the granular effusion, occupied the mucous surface of the cæcum and commencement of the colon. There was not a trace of ulceration, and the groups of Peyer's glands at the end of the ileum were free of disease. The mucous surface of the stomach presented patches of redness at its cardiac end.—*Chest.* Lungs did not collapse. In both, but chiefly in the left, there were several black nodules from extravasated blood (pulmonary apoplexy). In one the texture of the lung had been broken down, and cavities had formed; the smallest was the size of a pea, the largest that of a pigeon's egg. There was also a good deal of œdema of the lungs. The heart was healthy.

48. *Remittent Fever with Jaundice.*—*Tenderness at Margin of Right Ribs.*—*Coma.*—*Gastro-Duodenitis.*—*Enlarged Lymphatic Glands in the Course of the Common Duct.*—*Biliary Congestion of the Liver.*

Meerza Khan, a Mussulman, of twenty-six years of age, a

native of Peshawur, and following the occupation of a peon, was, after eight days' illness, admitted into hospital, on the 21st of October, 1848. The surface of the body and the conjunctivæ were tinged of a deep yellow colour. He complained of pain, much increased by pressure at the margin of the right false ribs, and there was some fulness there. The tongue was much coated and dryish in the centre, and the bowels were reported to be confined. The pulse was quick, full, and soft. No heat of skin. He continued in hospital till the 26th, when he died. The exacerbations were marked by excitement of manner, not by increased heat of skin. The excretions from the bowels and the urine were scanty. The pulse lost strength. The jaundice continued. He became drowsy on the 25th, then comatose.

He was treated with twenty-four leeches to the margin of the right ribs, followed by a small blister. Mercurial purgatives were given, also quinine in two or three-grain doses with an equal quantity of blue pill, every third or fourth hour. As the pulse failed, wine and ammonia were given, and attention was paid to suitable nourishment. On the 25th a blister was applied to the nucha.

Inspection five hours after death.—All the tissues were deeply tinged yellow.—*Chest.* The lungs did not collapse freely on the chest being opened, but were otherwise free of disease. The right side of the heart was distended with blood. The ascending aorta was a good deal dilated, and part of its inner surface was irregular.—*Abdomen.* The liver was not enlarged, but was of olive green tint. The mucous membrane of the stomach and duodenum was dotted red, but it was sound in texture. The end of the ileum was also reddened on its mucous surface, but was neither softened nor ulcerated. The course of the biliary ducts was traced. Lymphatic glands the size of a small bean embraced the common duct near to its termination in the duodenum. On both kidneys there were puckered cicatrices on the external surface, giving a lobulated character to the organ. In the left kidney, situated in a calyx, and branching into others, there was a calculus. The spleen adhered closely and firmly to the stomach and diaphragm. The head was not examined.

49. *Fever with Jaundice.*—*Tenderness at the Margin of the Right Ribs.*—*Drowsiness.*—*Biliary Congestion of the Liver.*—*Obstruction of the Hepatic Duct by a*

Lumbricus, of which there were many in the Duodenum and Stomach.—No Gastro-Duodenitis.—Enlargement of the Lymphatic Glands in the Course of the Common Duct.—Hepatic Cells distinct.

Chottoo Ram, a Hindoo peon, of twenty-five years of age, was, after ten days' illness, admitted into hospital on the 2nd February, 1849. He was much exhausted; there was heat of skin, a feeble pulse, yellow conjunctivæ, tenderness at the margin of the right ribs, and some degree of drowsiness. He died on the 4th, two days after admission.

Inspection twelve hours after death.—The tissues were tinged deeply yellow. The viscera of the chest healthy.—*Abdomen.* There was no peritonetic inflammation. The colon and cæcum were distended with air. The stomach contained greenish viscid mucus, and five or six lumbrici. The contents of the duodenum were somewhat similar, and there were also four or five lumbrici. The mucous coat of both was healthy.—*Liver.* The substance was of very yellow tint in places. The hepatic cells were seen distinctly under the microscope. The gall-bladder, not distended, was, however, full of dark thick bile. The hepatic duct was occupied and distended by a lumbricus, the sharp end of which extended into the common duct for about an inch beyond the junction of the cystic duct. The lumbricus was traced in the duct beyond its division, for about three inches into the substance of the liver, and in following the branch of the duct had been subjected to considerable curvature; it was not traced to its end in the liver, for it had been cut across.

On removing a slice of the liver for examination by the microscope, there was no redness of the mucous membrane of the duct observed. The chain of glands along the lower side of the common duct equalled a swan's quill in diameter.

50. *Remittent Fever with Jaundice.—Tenderness at the Margin of the Right Ribs.—Drowsiness.—Enlarged Lymphatic Glands.—Enlarged Head of the Pancreas.—No Duodenitis.—Biliary Congestion of the Liver.*

Balloo, a Hindoo labourer of thirty-five years of age, after suffering for fifteen days from fever characterized by evening exacerbations and morning remissions, was admitted into hos-

pital in a reduced state on the 11th June, 1849. He was jaundiced, and had been so for six days. The tongue was streaked yellow, and was somewhat florid at the tip and edges. There was tenderness, with resistance, below the margin of the false right ribs, and the edge of the spleen was perceptible under the left. During his stay in hospital the evening exacerbation was well marked, but frequently the remission in the morning was very slight. The jaundice persisted; the urine was of a deep brown colour, generally about twenty ounces in the twenty-four hours. The discharges from the bowels were of a pale colour, and there was no vomiting. He was quite collected on admission, but on the 20th June muttering delirium was first noticed. The pulse became feebler. There was subsultus on the 25th, and bleeding from the gums on the 26th. He became drowsy on the 28th, and died on the 5th of July, but without marked coma. The treatment consisted of twenty-four leeches to the margin of the right ribs, followed by a small blister; mercurial and other purgatives; quinine in three and four-grain doses, with blue pill and ipecacuanha during the remissions. Frequent sponging of the surface of the body with tepid water; saline diuretics, sago and chicken broth.

Examination eight hours after death.—All the tissues were tinged yellow.—*Chest.* Left lung collapsed, crepitating, and healthy. The right lung adhered by tender adhesions to the costal pleura, but was crepitating and healthy.—*Abdomen.* The intestines both small and large were contracted. The liver was somewhat enlarged, yellowish in colour, but natural in consistence. The gall-bladder contained some bile, but it was not distended. The common duct was surrounded in three-fourths of its circumference by the head of the pancreas, which seemed somewhat indurated, and larger than natural, and there the duct was somewhat contracted. On the other side of the duct, in contact with it, was an enlarged lymphatic gland, about an inch and a half in length and a quarter of an inch thick. The common, hepatic, and cystic ducts were permeable. The mucous membrane of the duodenum was healthy, and covered with bile.

51. *Remittent Fever with Jaundice.*—*Tenderness at the Margin of the Right Ribs.*—*Death from Exhaustion.*
—*Enlargement and Biliary Congestion of the Liver.*
—*Gastro-Duodenitis.*—*Hepatic Cells distinct.*
Sutwa Purojee, a Hindoo rope-maker, of twenty-seven years

of age, of stout habit of body, after suffering for twelve days from febrile symptoms—without, as reported, distinct remissions—was admitted into hospital on the 7th August, 1849. The abdomen was full, but no induration was detected; there was however tenderness at the margin of the right ribs. He had occasional vomiting, and the tongue was coated. The bowels were reported to be regular. He admitted that he made occasional use of spirits. Thirty-six leeches were applied to the epigastrium: quinine in four-grain doses, with blue pill and ipecacuanha, was given during the remission. There was not much heat of skin on the 9th and 10th; the pain was relieved, and the vomiting had ceased. Some compound powder of jalap was given on the 10th. On that evening there was a febrile exacerbation; it continued on the 11th (there having been shivering at midnight), with increase of tenderness at the epigastrium and margin of right ribs, with hepatic dulness to within an inch and a half of the umbilicus, and commencing jaundice. Respiration short and hurried; pulse frequent and small; tongue dry, with dark fur. Fifty leeches were applied to the margin of the ribs; ten grains of calomel, and four of compound extract of colocynth, were given. At noon, the skin was cool; the pulse feeble. The bowels once opened, the evacuation pale. The side was said to be easier, but the breathing continued hurried, and he died about an hour after the Report.*

Inspection three hours after death.—The body was not much reduced, and the tissues were tinged deeply yellow.—*Chest.* The lungs were crepitating, but somewhat inflated. There were no adhesions between the pulmonary and costal pleuræ. The heart was healthy.—*Abdomen.* The liver was much enlarged, reaching beyond the margin of the false ribs, from the tenth rib of the right side to within an inch and a half of the umbilicus, and thence to the most prominent part of the seventh left rib. No adhesions existed between it and the surrounding parts. When incised, the surfaces were found somewhat redder, and also of an olive green tint, and the substance was softer than natural throughout. The gall-bladder contained serous-looking bile. The stomach was full of half-digested food. Its mucous membrane was of a rose colour uniformly, except in a

* In this case the fatal result was expedited by the injudicious use of depressants in the advanced stage of fever; indeed, it is not improbable that the exacerbation on the 10th was favoured by the purgative which was then given.

few places, where there was a deeper dotted redness, with some degree of softening. The inner surface of the duodenum was tinged with bile, and its mucous membrane, as well as that of the large intestine, was of a redder colour than natural. The kidneys were large, and of a dark (almost black) red colour throughout, evidently from congestion of blood. The spleen was not enlarged. The head was not examined.—A small portion of the glandular substance of the liver was examined under the microscope, and exhibited the hepatic cells distinct.

52. *Remittent Fever with Jaundice in an Opium-Eater.*
—*Tenderness at the Epigastrium.*—*No Coma.*—*Death from Exhaustion.*—*Enlargement and Biliary Congestion of the Liver.*—*No Duodenitis.*—*No Enlargement of the Lymphatic Glands.*

Synd Bux, a Mussulman, a native of Mooltan, sixty years of age, and following the occupation of a Fakir, was in the habit of taking opium, but only he said to the extent of two grains daily. After twelve days' illness with fever and epigastric tenderness, he was admitted into hospital on the 23rd January, 1850. There was tenderness on pressure at the epigastrium, and dulness for two inches and a half below the ensiform cartilage. The spleen was also enlarged. The pulse was frequent and feeble. The tongue dryish with a yellow central coat and florid tip and edges. The conjunctivæ were yellow. On the 23rd, 24th, and 25th there was a febrile exacerbation. The urine was high coloured, the alvine discharges scanty and pale. From the 26th to the 1st February, there was very little febrile disturbance, and the jaundice seemed to lessen somewhat, but there was no improvement in the strength of the pulse, the emaciation rather increased, and the movements of the limbs were tremulous. On the 1st of February, his manner was sluggish, and from this time increase of the febrile disturbance, and of the asthenia took place. He died on the 7th without coma.

The treatment consisted of a small blister to the epigastrium, an occasional laxative, and quinine in four-grain doses in solution, combined with nitrate of potass, and spiritus ætheris nitricus; during the remission, chicken soup and wine.

Inspection seventeen hours after death.—The tissues of the body, chiefly the adipose and areolar, were tinged yellow. On opening the chest the lungs remained slightly inflated.

There were some old adhesions between the outer and back part of the right lung and the costal pleura. The substance of both lungs was crepitating. The walls of the heart generally were thin, but there was no structural change in any part. — *Abdomen.* The liver was enlarged and extended across the epigastric region, reaching on the right side to the ninth rib, and on the left, to the cartilage of the eighth rib. No apparent morbid change in the substance of the liver; it presented a uniform olive green appearance, evidently from bilious congestion. The gall-bladder contained some bile. The common, hepatic, and cystic ducts were pervious. There was no enlargement of the lymphatic glands or of other structure about these ducts. The contents of the duodenum were tinged with bile. The mucous membrane of the duodenum was apparently healthy. The spleen was considerably enlarged, reaching from the sixth rib to the last. The stomach was somewhat contracted. The transverse colon was displaced, one portion of it forming an angle with another which was directed downwards. The kidneys were healthy.

53. *Remittent Fever with Jaundice.*—*Tenderness at the Margin of the Right Ribs.*—*Death from Exhaustion.* — *Cirrhosis.* — *Gall-bladder distended.* — *Enlarged Lymphatic Glands around the Common Duct.* — *Duodenitis.* — *Granular Exudation on the Mucous Membrane of the Ileum and Large Intestine.*

Elaee Buccus, a Mussulman, subsisting by begging, of sixty years of age, and visiting Bombay on his way to Mecca, was admitted into hospital in a reduced state, on the 10th July, 1850.* He stated that he had been ill with fever for about thirteen days. He was jaundiced. There was tenderness below the margin of the right ribs, and dulness for the extent of two inches. There was also enlargement of the spleen. There was increased heat of skin. The tongue was dry and coated in the centre, and florid at the tip and edges. The bowels were reported to be slow. Calomel six grains, extract of colocynth eight grains, were given, and on the following morn-

* In this case, as well as that which immediately precedes it, there was a check to the fever from the use of quinine, but no tendency to the recovery of strength, owing probably to the advanced age and asthenia of the subjects.

ing pulv. jalap. comp., one drachm; but with the effect of causing little action of the bowels. Twelve leeches were applied to the margin of the ribs, followed by a small blister. On the 13th, quinine in four-grain doses was given, and repeated daily, and from that time to the 24th there was no recurrence of fever. The abdominal tenderness and the jaundice also gradually disappeared, the urine was no longer tinged green by nitric acid, and the tongue cleaned and became moist; but there was little improvement in strength. On the 24th, abdominal uneasiness was complained of, and a rhubarb draught was given, but it produced no effect. In the evening there was recurrence of febrile exacerbation, and on the 26th dysenteric discharges. Under these symptoms, but without return of jaundice, he continued losing strength till the 2nd August, when he died without coma.

Inspection ten hours after death.—The body was much emaciated.—*Chest.* The right lung collapsed freely. There were two or three large emphysematous bullæ at the anterior margin of this lung; otherwise it was quite healthy. The left lung was connected to the costal pleura by firm adhesions, also its base to the diaphragm and its anterior edge to the pericardium. The substance of the lung was crepitating. The heart was healthy.—*Abdomen.* The liver almost entirely consisted of the right lobe. The gall-bladder distended, reached almost to the centre of the epigastric region, and was situated over the gastro-hepatic omentum. The external surface of the liver was somewhat irregular. When cut into, the substance was not found indurated, but the incised surface presented here and there distinct white streaks apparently from hypertrophy of areolar tissue; there was however no distinct lobular appearance. The lymphatic glands about the common duct were nearly the size of an olive, but they did not press upon the duct, which seemed more dilated than usual. This duct, as well as the hepatic and cystic ducts, were permeable. When they were laid open, the mucous membrane presented the usual reticulated appearance, but not a trace of redness. The contents of the gall-bladder were dark green, and very adhesive from admixture of mucus. The mucous membrane of the stomach was very rugous, and mottled red towards the pyloric end, but without softening. There was a good deal of dark redness of the mucous membrane of the duodenum arranged in streaks and patches, and chiefly occupying the apices of the rugæ. Brunner's glands were distinct, numerous, and elevated. The mucous membrane of the duodenum was neither softened nor thickened. The mucous membrane of

the lower end of the ileum,—about two feet of it—also that of the cœcum, the ascending and transverse colon, presented a dark red mottled appearance, with exception of the cœcum, where the redness was uniform. Here and there there was granular exudation on the surface, to a slight degree in the ileum, but more general on parts of the large intestine. In places the exudation had a dark grey appearance, and portions of the mucous membrane seemed abraded, as if from superficial ulceration. In these situations the lining membrane was connected to the subjacent tunic more closely than natural. The spleen was somewhat enlarged (six inches in length), but apparently healthy in structure. The kidneys were healthy.

54. *Fever with Jaundice.*—*Died exhausted.*—*Biliary Congestion of the Liver.*—*No Enlargement of the Lymphatic Glands.*—*Contraction of the Cystic Duct.*—*Distension of the Gall-bladder, Mucous Membrane of Gall-bladder and Ducts normal, with exception of Slight Vascularity of Common Duct at Point of Entrance into Duodenum.*—*Hepatic Cells distinct.*

Sukeah, a Hindoo, of twenty-two years of age, was admitted into hospital, after nine days' illness, on the 28th August, 1850. He was jaundiced, drowsy, and very exhausted. He died ten hours after admission.

Inspection ten hours after death.—All the structures were tinged yellow.—*Abdomen.* The liver projected about two inches below the ensiform cartilage and right false ribs; its incised surface presented generally a yellowish appearance; its consistence was pretty firm, and almost natural. On examination under the microscope, the hepatic cells were distinctly seen. The hepatic and common ducts were of natural dimensions, not turgid with bile, and when laid open, the mucous surface presented its normal appearance, with the exception of slight vascularity at the termination of the common duct in the duodenum. The lymphatic glands around the common duct were neither increased in number nor in size. The gall-bladder was distended with bile of a dark green (almost black) colour. The cystic duct was very much contracted, and there was some obstruction at its commencement, which prevented the point of a probe from entering the gall-bladder. Its mucous surface was healthy. The mucous membrane of the duodenum presented a dark grey colour, with here and there streaks of redness. The

glands of Brunner were very turgid, and distinctly seen. Nowhere was softening or ulceration detected. The stomach contained a few ounces of a dark-coloured liquid; its mucous surface presented a dark grey colour, with patches of redness over the prominent rugæ, and there were also seen two or three small projections on the mucous surface, apparently caused by some deposit; one of them (the largest) was about the size of a pea, and was covered with coagulated blood. Two or three small ulcerated spots were also seen on the mucous membrane of the stomach, which could be easily peeled off from the subjacent tissue. The small intestines were rather contracted. The kidneys were natural in size and structure; but the substance was tinged yellow. The heart was healthy.

55. *Remittent Fever with Jaundice.—Drowsiness.—Enlarged Lymphatic Glands in course of Common Duct.—Constricted Cystic Duct.—Gall-bladder full.*

A Hindoo, about thirty years of age, was admitted into the hospital in February, 1849, with fever, drowsiness, and jaundice, and died about twenty-four hours after admission.

Inspection thirty-three hours after death.—The gall-bladder was full of bile, but not distended. Along the common duct, about two inches, reaching almost to the duodenum, were enlarged lymphatic glands, both below and above the duct, each about the size of a small olive, and when cut giving out a brown turbid fluid, the consequence of decomposition. The hepatic duct was pervious to the probe; but the cystic duct above its junction was so constricted that the small end of the blow-pipe could not be passed through it.

56. *Remittent Fever with Jaundice.—No Tenderness at Margin of Ribs.—Drowsiness.—No Enlargement of Lymphatic Glands.—Dark-redness of Mucous Membrane of Duodenum.*

Syed Mohedeen, a Mussulman beggar, of forty years of age, and of feeble constitution, after suffering for twelve days from febrile symptoms, coming on at irregular periods, preceded by chilliness, and attended during the last eight days with looseness of the bowels, was admitted into hospital on the 28th August, 1850. He was jaundiced. There was no induration or dullness at the margins of the ribs; and he made no complaint of pain. The pulse was feeble. The tongue, coated in the

centre, was florid at the tip and edges. He died on the 12th September. Whilst under observation the bowels were relaxed; the evacuations were generally of a yellowish colour, sometimes scanty and passed with straining, but not tinged with blood. From the 31st to the 5th there was improvement—febrile disturbance lessened, the tongue became more natural, and the jaundice decreased; but, from the 6th, there was again aggravation, with (on the 10th) tremulous hands, brown dry tongue, and drowsiness. The urine throughout was scanty and high-coloured, but showed no traces of albumen.

Examination thirteen hours after death.—*Head.* The vessels of the dura mater were found turgid with blood, and the membrane somewhat tinged yellow. The vessels of the pia mater were also congested. On the inferior surface of the posterior lobe of the right side, and extending into its sulci, there was some extravasation of blood into the meshes of the pia mater. The substance of the brain was free from structural change. When incised it presented some bloody points here and there. There was no increased serous fluid found in the ventricles, and no extravasation of blood into the substance of the brain.—*Chest.* The upper lobe of the left lung, and the thin anterior edge of the lower one, were soft and crepitating; but the rest of the lower lobe was in a state of red hepatization. The whole of the right lung was healthy, excepting the thin posterior margin of its lower part, which was in a state of red engorgement. The structure of the heart was healthy, but its valves were tinged yellow.—*Abdomen.* The substance of the liver was healthy in structure. The mucous membrane of the stomach was healthy, but it contained yellow brown mucous-looking contents, with several lumbrici. The mucous membrane of the duodenum presented dark red patches; and the glands of Brunner appeared to be more than usually prominent and distinct. No compression of the biliary ducts from enlarged glands was detected. The common and hepatic ducts were found permeable. On the mucous membrane of the large intestines there were patches of red and grey discoloration, which were most marked in the ascending colon and cæcum; but no traces of ulceration nor change in the consistence of the tissue were observed. The mucous membrane of the ileum appeared healthy, with the exception of patches of faint redness here and there. The glands of Peyer were healthy. The spleen was much enlarged, and measured six inches by five; but was of natural structure, except at its convex surface, where there were two deposits of tubercular-looking matter, each the size of a

small bean. The kidneys were healthy in structure, but tinged yellow.

Parotitis.—Considerable tumefaction, ending in supuration, in the situation of one or both parotid glands, is an occasional occurrence in remittent fever. I have witnessed it only in natives, and always associated with febrile symptoms of marked adynamic character. I have before me the notes of three cases, the subjects of which all recovered after a long and tedious illness.

Pathology of Inflammatory, Adynamic, and Congestive Remittent Fever.—The observations which I had to offer on the pathology of these modifications of remittent fever have already been incidentally made in connexion with the symptoms. Their relation to particular states of the constitution, degrees of the morbid cause, and previously existing structural disease, are the leading facts which should be borne in mind.

Pneumonia.—This complication, as already explained, will be considered at the same time with idiopathic pneumonia.

SECTION IV.

TREATMENT.—CONTRAST OF THE PRINCIPLES OF TREATMENT OF MALARIOUS REMITTENT FEVER, AND THE ZYMOTIC CONTINUED FEVERS OF COLD CLIMATES.—TREATMENT OF ORDINARY, INFLAMMATORY, CONGESTIVE, ADYNAMIC, AND IRREGULAR TYPES OF REMITTENT FEVER.—TIEN OF THOSE COMPLICATED WITH CEREBRAL AFFECTION, GASTRIC IRRITABILITY, JAUNDICE, HEPATITIS.

It has been already stated that the essential difference between intermittent and remittent fever is, that in the former a periodic cessation—intermission of the febrile phenomena takes place; while in the latter there is only abatement—remission.

Both these forms of fever doubtless depend on different degrees of the same morbid cause — malaria, — a *materies morbi*, which, generated without, becomes received into the blood.

It may in theory be inferred that similar principles of treatment will be found to apply to diseases so nearly allied, and clinical experience confirms this conclusion.

We shall, therefore, best prepare the way for considering the treatment of remittent fever, by recapitulating those leading principles which have already been inculcated in respect to intermittent fever, and then pointing out the general character of the modifications which the difference in degree of the morbid actions in the two types may require. After a paroxysm of intermittent fever has fairly commenced, then a certain course, which we are unable to check, must be run before it comes to a close; and this fact of clinical observation is quite in harmony with the nature of the cause. Though we are hardly justified in supposing that therapeutic agents, opposed in their influence to malaria, may not at some future time be discovered, yet we may reasonably doubt the probability of these being effective when used during the *acme* of the deranged actions. At all events, in the present state of practical medicine, we are forced to admit our inability to stop a paroxysm of intermittent fever after it has fairly begun.

The susceptibility of enfeebled persons to become the subjects of intermittent fever, and the tendency of the fever, under these circumstances, to be protracted, — that is, to be liable to recurrences of the paroxysm, — may, I think, be received as a truth. Clinical observation teaches that if much debility be produced by treatment in intermittent fever, this greater liability to

recurrence and to a protracted course becomes materially increased. In this we have merely an illustration of the law that a morbid cause when in operation is always more influential on the predisposed from debility, however induced.

If there coexist with the febrile phenomena such undue derangement of the capillary circulation of important organs, as is likely to injure their structures, or otherwise seriously to impede their functions, then the means appropriate for the removal of these must be used.

Though we cannot stop a paroxysm of intermittent fever, yet we may somewhat influence the degree of vascular excitement, thus lessen the discomfort of the patient, and the amount of local capillary derangements when such are present. We effect this indication by attention to ventilation, purity of atmosphere, reduction of the temperature of the surface of the body, and attention to quietness and repose. These means do not lead to abstractions from the blood, and are therefore not debilitating in their action.

But we can also accomplish the same object by evacuations, as blood-letting and purgatives. These means, however, are debilitating, and ought not to be used except in cases in which we believe that the necessity for decided, though it be only temporary, reduction of vascular excitement, is so pressing as to justify our setting aside for the time the consideration of the lesser because the remoter evil.

Although we are unable to interrupt a paroxysm of intermittent fever when once formed, yet in quinine we are provided with an effective means of preventing its recurrence. When we compare this statement with that of our little control over the paroxysm, it becomes

evident that the strength of medical practice in this disease is confined to the period of intermission.

These general principles are as applicable to the treatment of remittent as of intermittent fever; and now I shall endeavour to explain in what respect they call for modification in the former type.

In intermittent fever there is in general not much risk of injury to important organs during the stage of febrile reaction. Frequent recurrence of the paroxysm is not in general attended with immediate danger to life. It does harm by deteriorating the constitution.

In remittent fever, on the other hand, there is more commonly risk of injury from the increased vascular action of the stage of exacerbation. Recurrences of the exacerbation are, therefore, attended with immediate danger to life from lesion of important organs, or depression of vital actions. Hence in the treatment of remittent fever there is more frequently necessity for the reduction of vascular action by depletory means; but, at the same time, much greater demand for discrimination and caution; for the evils of the injudicious use of depressant remedies are more immediate, more certain, and more serious. If such are the dangers which more or less attend upon the exacerbation of remittent fever, then the prevention of its recurrence, by the efficient use of quinine given in the remission, is even more urgent than the same indication in the intermission of intermittent fever.

If it be true that, at some periods of the exacerbation of remittent fever, there may be risk of injury to important organs, from excessive vascular action calling for control by depletion, and that, at other periods, there may be danger to life from exhaustion requiring the prompt use of stimulants and nourishment; if it

be also true that the periods of exacerbation and remission are liable to vary in different cases, that it is most important to prevent the exacerbation, and that we possess the means of doing so; then it follows, that there cannot be successful treatment of remittent fever, justice to the sick, or loyalty to the profession of medicine, unless our visits be frequent, and our watching attentive and well-timed.

At the opening of my remarks on the pathology of remittent fever it was stated that, when the influence of the cause of remittent fever is compared with that of the cause of the zymotic continued fevers of the colder climates, this striking difference may be observed. In the former there are daily remissions of the influence with tendency, more or less, to return to normal actions: in the latter the influence is continuous and unabated for many successive days.

This difference affects most materially the principles of treatment. In both, the febrile reaction is caused by a materies in the blood, whose power, when thus in operation, we are unable to stop. In both, but more in the remittent fever than in the others, there may be danger to important organs from deranged capillary circulation rendering necessary the adoption of means for lessening vascular excitement.

In both there is danger to life from depression of vital actions, whether from the influence of the cause, or the continuance of the febrile disturbance, or the previous condition of the subject, or of all combined, requiring attention to stimulants and support.

In remittent fever there are suspensions of the febrile condition, and there is an agent, which, when effectively used in this remission, tends to prevent the recurrence of the fever, and thus most materially to shorten the

general course of the disease. In this lies the strength of medical practice in remittent fever. It has no place in the treatment of the zymotic continued fevers of the colder climates.

In these continued fevers there is less frequently necessity for controlling local capillary derangements and little risk of sudden unexpected exhaustion. The course of the disease is, compared with that of remittent fever, steady and protracted, and the main indication of treatment is, by warding off undue prostration, to conduct the patient safely to its close. The treatment is, therefore, expectant, and, for several days in succession, may call for little change.

Contrast this with what has been already said of remittent fever, the changes of exacerbation and remission — and the varying periods of these — taking place within a few hours, and requiring decided modification of the means of cure.

It was in order to point to this contrast in the principles of treatment that I have entered into this comparison between remittent and zymotic continued fever and have shown the invariable necessity for constant watching and action in the one, and the sufficiency for the most part of expectant principles in the other.

I have thought it well to fix attention on these doctrines, for I am satisfied, from observation, that medical men whose practical knowledge of fever has been acquired in hospitals in European countries do not quickly realise to themselves the frequent changes which take place in remittent fever, the importance of watching them, and of regarding them in treatment.

On the other hand, when we look back to the state of practice in fevers in India, twenty years ago, it is evident that principles of treatment of zymotic fevers

in the colder climates, which are equally applicable to remittent fever, were lost sight of and neglected. I mean principles which acknowledge our inability, in the present state of the science, to cut short the febrile * disturbance of a zymotic cause, and which admit the great danger to life from depression of vital actions.

I now proceed to describe the treatment which is applicable to the different circumstances of remittent fever, and then to offer a few observations on some of the principal remedial means.

Remittent Fever in its most common and most tractable Form.

In illustrating the treatment of this form of the disease I shall refer chiefly to the results of my experience in the European General Hospital at Bombay. The individuals affected were, for the most part, seamen, and were admitted generally about the third day of the disease. In almost all during the exacerbation there was a good deal of headache, with flushing of the countenance, and in a small proportion there was vomiting, with some degree of tenderness on pressure at the epigastrium. In the greater number the tongue was coated yellow in the centre, in some expanded, in others contracted and pointed with florid edges and tip. The pulse was generally neither firm, nor bounding, but frequent and moderate in strength. In a great many instances the secretions from the bowels were dark or greenish in colour, but became natural as the tongue cleaned.

The remittent character of the fever was well marked.

In treating the exacerbation, general blood-letting was unnecessary. In cases in which there was much head-

* In applying this principle to remittent fever, I speak of the febrile disturbance of the stage of exacerbation.

ache and flushing of the face, from thirty-six to sixty leeches to the temples, with the assiduous use of cold applications to the head, were required. In cases in which there was tenderness at the epigastrium, and a tongue contracted with florid edges and tip, there was necessity for more or less leeching of the epigastrium, the use of effervescing draughts and cold drinks in small quantity at a time, and the avoidance of emetics, antimonials, mercurials, and purgatives. When the headache was moderate, and symptoms of gastric irritation were not present, it was sufficient to endeavour to mitigate the febrile excitement by cold applications to the head, frequent tepid sponging of the surface of the body, antimony in small doses, or the aqua acetatis ammoniæ.

Emetics were often useful at the commencement of the attacks, but they required to be given with much discrimination. In cases in which the tongue was foul and expanded but not florid, and in which there was nausea without vomiting or epigastric tenderness, twenty-five grains of ipecacuanha was the emetic which was generally used with advantage.

During the first two or three days of the attack, when the tongue was foul but not florid, the alvine excretions vitiated, the abdomen full and resisting, and the action of the vascular system steady and without tendency to depression, then it was an important part of treatment to give a ten-grain dose of calomel, combined with a few grains of antimonial powder, and some hours afterwards an aperient, as the compound powder of jalap. The calomel was most generally given at bed-time, and the compound powder of jalap in the morning. The exhibition of calomel and purgatives, even to the degree now recommended, is seldom ex-

pedient after the third or fourth day of the disease, and they are unnecessary, even at an earlier period, if the abdomen be soft and without fulness, notwithstanding the presence of disordered alvine excretions and a coated tongue.

After the first or second febrile exacerbation a full dose* of muriate of morphia was in many cases exhibited at bed-time, with much propriety and benefit. Where there is headache with much heat and dryness of skin and vascular excitement, the muriate of morphia is contra-indicated; but in most cases where there has been good management at the commencement—adequate leeching, the appropriate use of calomel and purgatives—there follows, on the succeeding night, slight pyrexia with restlessness, but without headache, a supple abdomen, a tongue still foul but moist, a pulse above natural frequency but soft. In a case of this kind, calomel or blue pill, in a dose proportioned to the state of the tongue and the condition of the secretions in regard to quantity and quality, with a grain of ipecacuanha and one of muriate of morphia, preceded by a foot-bath, perhaps by a few leeches to the temples, will generally be found to give a good night's rest; and if followed when necessary in the morning by castor oil, or compound powder of jalap, will very frequently be succeeded by a forenoon remission so distinct that quinine may be freely exhibited. Further, this course tends to bring about a natural state of the secretions with less risk of gastro-enteric irritation.

But the remedial means, to which as yet my remarks have been directed, have had in view the decrease of the state of vascular excitement during the exacerbation,

* This recommendation must be carefully considered in connexion with my subsequent remarks on the use of full opiates in remittent fever.

the protection of organs important to life from the risk of harm by undue determinations of blood, and the correction of functions which may be deranged. These are all very important considerations, but they are subordinate to the main indication of cure in remittent fever, which is in every respect the same as that which has been already insisted upon in regard to intermittents, viz. to take advantage of the earliest remission, and adopt means to prevent the recurrence of the febrile exacerbation, or failing that, to postpone its access, or lessen its severity. The same course should be observed in all subsequent remissions, irrespective of local complications which may require special means for their removal, and to which it is very important that every attention should be given, but which should not be allowed to interfere materially with the steady pursuit of the leading indication of cure as now stated.

For preventing the exacerbation or, failing that, lessening its severity or postponing its access, quinine will be found to be as efficacious as in preventing the paroxysm of intermittent fever.

The earliest evidence of remission should be regarded, and quinine be given in from four to six grain doses every second or third hour, for four or five times. Should the exacerbation not recur, the quinine is to be continued every third or fourth hour, till the febrile phenomena have altogether disappeared.

But in remittent fever of the character of which I now speak, derangements of function coexist with the remission, and, therefore, in the management of this stage it is often advantageous not to overlook them.

It is very true that these derangements are most surely and speedily corrected by the mere prevention of the exacerbation. Yet we may often do good by remedial

means, more specially directed against them. It may be received, I believe, as a therapeutic principle in the management of remittent fever, that all medicines, the object of the exhibition of which is not the mere reduction of vascular action, may be given, with less likelihood of harm and more probability of effecting the end aimed at, during the remission than during the exacerbation. Nor is it difficult to suggest an explanation of this. The less abnormal state of the general and capillary circulation, characteristic of remission, is more favourable to absorption and to the other processes concerned in therapeutic actions.

For these reasons it will sometimes be useful, when an aperient action is indicated, to combine two drachms of sulphate of magnesia with one or two doses of quinine. When the bowels are slow and the tongue much coated, a grain or two of calomel or blue pill with aloes may be combined with two or three of the doses of quinine. If there be tendency to diarrhœa, the quinine may be combined with appropriate opiates. If there be nausea, the use of effervescing draughts with the quinine is often beneficial. But while we carry out these principles we must always bear in mind that they are subordinate to the prevention of the exacerbation, and if their application at all interferes with this, they must, for the time, be set aside.

In these remarks on the treatment of ordinary remittent fever, I have had chiefly in view, as already stated, my experience in the European General Hospital, but they are equally applicable to the same form of the disease in more sthenic Europeans and earlier stages, with this addition, that at the very commencement, a general blood-letting of from sixteen to twenty ounces, may often be an expedient measure.

They are also applicable to the same form of fever, in natives of good constitution, with this exception, that in these there is less necessity for leeching, for calomel, purgatives, and the use of a full opiate in the manner recommended.

In regard to diet. In ordinary remittent fever so treated that there occurs no undue exhaustion from the injudicious use of depressant means, stimulants are unnecessary and animal broths uncalled for, till convalescence has fairly commenced.

On examining the diaries of sixteen well-marked cases of ordinary remittent fever treated in the European Hospital in accordance with these principles, I find that from the commencement of the attack to the perfect cessation of all febrile symptoms, the average period was six days and a half. Of these, two were passed before admission, and four and a half under treatment in hospital.

I would now, in respect to ordinary remittent fever, repeat what has already been stated in respect to intermittent fever, — that we are not to be satisfied with the mere recovery of the patient; but are also to regard the degree of efficiency to which he has been restored. This will always be in proportion to the judgment displayed in abstaining from unnecessary depressants in the exacerbation; and in the early prevention of the exacerbation by the efficient use of quinine in the remission.

Inflammatory Remittent Fever.—In this form of remittent fever occurring in sthenic Europeans recently arrived in India, and attended with a greater degree of febrile excitement, and of cerebral and gastric derangement, the indication in the exacerbation is to use more effective means for reducing the excessive vascular action which threatens to injure important organs.

There is, then, more necessity for general blood-letting, the freer use of leeches, and the assiduous application of cold to the head. In many cases in which the skin is dry and steadily hot, cold affusion may be used from time to time with great advantage. Emetics and antimonials are in general contra-indicated from the tendency to irritability of stomach which is present.

Though free excretion by the liver and intestinal canal is a distinct indication, with the view of lessening the febrile reaction by evacuation and the removal of products of tissue metamorphosis, present no doubt in excess in the blood, yet we are frequently obliged to be very cautious in the use of calomel and purgatives. For there is often present a condition of capillary congestion of or determination to the gastro-intestinal lining, which is very apt to be increased or converted into inflammatory action by the use of irritants*, and when so, to aggravate the febrile condition. In this difficulty, then, we must keep these opposing principles before us, and lean to one or the other, as our judgment may dictate in particular cases. We shall often act best by premising the application of leeches to the epigastrium during the exacerbation, and deferring the use of the one or two or three ten-grain doses of calomel which may be necessary till the period of remission, and then combine them with opium, while at the same time we exhibit quinine.

I inculcate, then, the doctrine that in the treatment of inflammatory remittent fever, a freer use of depletory means is required in the exacerbation. But it should be recollected, that these means ought still to be applied

* I do not share in the belief that large doses of calomel have a sedative action on inflamed mucous membrane. This subject is more fully noticed elsewhere.

with watching and caution, and that the time for their use is at the height, not the close, of an early exacerbation. They are used not with the hope of cutting short the disease, but merely of lessening the risk of injury from great vascular excitement. It must be further remembered, that they are being used in a disease which, if it persists, is sooner or later sure to terminate in signal depression of the vital actions. The safe guide to depletory remedies is the presence of a dry skin, of steadily increased temperature, and a pulse frequent, firm, and of good volume. It must not be supposed, that a sthenic lately-arrived European, and an early stage of the attack, are conditions which necessarily indicate the propriety of free abstraction of blood, and other depressant means. It must be borne in mind that in all states of constitution, the sedative influence of the malaria may be present in great degree at the very outset of the disease, and that then evacuant remedies are likely to be injurious. If then (it matters not what the constitution or the duration of the attack may be) the pulse be badly developed and easily compressed, and the general surface of the body not steadily dry and of augmented temperature, we must be very cautious. I do not say that under these circumstances general blood-letting may never be had recourse to; but I am very sure that we should be watchful, that the finger should be on the pulse as the blood flows, and if the pulse does not soon give indication of improved action of the heart, which I believe it seldom will, then the further abstraction of blood must be stopped.

Such then are the principles and the means which it seems to me should be applied in the treatment of the exacerbation in inflammatory remittent. They must be considered in connexion with what has previously been

said in respect to the management of the same stage of the ordinary form of the disease.

In the treatment of the stage of remission the principles laid down in regard to ordinary remittents still more forcibly apply to the present form. Quinine in from five to eight-grain doses should be given every second hour; or it may be necessary, when the remission is very short, to give the quinine every hour. It should be continued or intermitted in the manner already explained.

Congestive Remittent Fever.—Having in the course of my remarks on the treatment of inflammatory remittent fever enjoined necessity for caution in the use of blood-letting when the symptoms tend to be congestive in character, I have no hesitation in dissuading from its use when this form of fever is distinctly developed.

Viewing the state of internal congestion of blood, which no doubt exists in these cases, as one of the conditions necessarily resulting from a depressed state of the vital actions of the vascular and nervous systems,—the practice of general blood-letting has not recommended itself to me as a means calculated to effect good. On the contrary, I believe that it is certain to aggravate the mischief. Of this effect I have witnessed one instance in a private of the 15th Hussars, to the diary of whose case, however, I have not at present the means of referring.

The treatment, it seems to me, should consist in the judicious external use of stimulants, and in the exhibition of calomel and quinine frequently repeated. The instance in which I have witnessed the most marked benefit from these remedies was in a seaman of the name of Crookberry, attacked with fever after exposure in the Dockyard at Bombay, in October 1840. The skin was

coldish and damp, the pulse frequent, compressible and becoming feeble, the manner heavy with drowsiness and wandering delirium, and the secretions from the liver and intestines not free. He continued in this state for twenty-four hours, not improving under the use of free doses of calomel, a blister to the nucha, and exhibition of wine. Quinine and calomel were then given in two grain doses of each, and were repeated at intervals.* The pulse and the skin improved under this treatment, then two or three days of febrile exacerbation succeeded, and recovery took place.

When the symptoms of congestion pass away and febrile reaction develops itself, then the treatment must be in accordance with the principles explained under the ordinary and inflammatory forms, and those which are about to be noticed in the continued and adynamic forms—as the one or the other happens to apply to the particular instance.

The suggestion made at the opening of my pathological remarks on remittent fever—that congestive symptoms may in some cases be related to old-standing disease of the heart, the liver or kidneys—is an additional reason for observing great caution in the treatment of such cases, more particularly as regards the use of depletory and other depressant means.

Remittent Fever tending to become continued, then Adynamic in Character.—In years and at seasons when the causes are intense or the predisposition great, remittent fever frequently exhibits a severe character; and this greater severity is evinced not by its assuming the inflammatory form, but by the tendency to a well-marked remission being less apparent, and by the febrile exacer-

* The quinine should certainly be given in larger doses than in this case.

bation, in the worst cases, assuming an almost continued form for two or three successive days. Cases of this kind are more difficult to treat, because they frequently do not admit, for several days, of quinine being given in doses sufficiently large to make any great impression on the disease. Still I think that even in cases in which the remission is very imperfect, quinine should be tried, and repeated, or not, in subsequent remissions, according to the effect.

When the evidence is good that this remedy has not acted well, all that can be done is to recollect the principles applied to the treatment of typhus and typhoid continued fever, and guide the patient through the attack, protecting important organs from undue determinations of blood, and taking care that this indication is not effected by means which will too much reduce and depress the vital actions of the system, and favour the accession of adynamic symptoms. Then, so soon as the remission becomes marked, to have recourse to quinine. Though thus conceding that cases of remittent fever may occur in which, unfortunately, it is not admissible to use quinine very early in the disease, still I am convinced that the more closely such doubtful cases are watched, the more frequent the opportunities of exhibiting quinine will be found to present themselves, and this watchfulness should be enforced from the very commencement of the attack; for I have already said that very often in such cases the tendency to a fair remission is more perfect during the two or three first days,—the continued form coming on as a subsequent event.

When remittent fevers have thus passed into the almost continued form, they are after a time, as explained in my notice of the symptoms, liable to evince a train of adynamic phenomena, and then the only

mode of managing them is, to recollect the principles laid down by Cullen, that "fevers tend to cure themselves," and that the indication of cure is "to obviate the tendency to death."* In fact, all that can be done in such cases is to reduce the increased temperature of the surface by tepid sponging, and to sustain the pulse by light nourishment, wine and other stimulants; to attend to the excretions, and to have recourse to the cautious and moderate use of small blisters over the organs that may seem to be chiefly affected, taking care that they are not carried to the degree of increasing the febrile excitement, and recollecting that in the adynamic state of remittent fever, in the very advanced stages, a tendency to run into gangrene is evinced equally as in European typhus.

Such are the resources to which we are restricted when adynamic symptoms coexist with a state of fever in which the remissions are not marked. But, should the remission become distinct, dryness and brownness of the tongue offer no drawback to the use of quinine. I have seen cases, and of one the diary is before me, that of Penn, aged twenty-one, of Her Majesty's Ship *Endymion*, ill with dockyard fever, in which, after about ten days of almost continued fever, attended in the last days with brown dry tongue and other adynamic symptoms, a remission was taken advantage of

* Under these circumstances, to attempt to affect the system with mercury, or to hope to control local inflammations by free leeching, or to correct the abdominal secretions by active purgatives, are measures so totally at variance with the indications of cure, and so destructive of the faint hope of recovery which it is useful to maintain, that were it not for the indiscriminate manner in which these means have been frequently used, it would be unnecessary to allude to them here.

and quinine was freely used and continued with very marked benefit through each succeeding remission. The exacerbation decreased and quickly ceased, and, coincident with this effect, the tongue became cleaner and moister,—and this clearly because the dryness of the tongue was but a sequence of the persistence of the febrile action, and one of the proofs of diminished secretion. Not only did the tongue in this instance become moist, but, for a similar reason, the secretions from the bowels became more regular, freer, and more natural in appearance.

We have every encouragement, under these circumstances, to persevere in the appropriate course of treatment; for, in young and previously healthy subjects, recovery not unfrequently takes place from an unfavourable train of adynamic symptoms, including more or less delirium, with well-marked tendency to drowsiness.

Remittent Fever—with Badly Developed Symptoms; with Symptoms of Unexpected Collapse; with Certain Occasional Features.—Under these heads, in the Section on Symptoms, I have described phenomena, which all point to the tendency, in remittent fever, of vital actions to become depressed, and to issue in death. In noticing these phenomena, with reference to treatment, all that can be said is, that they forcibly inculcate upon us the necessity of familiarising ourselves with the principles which regulate the use of depletory means; and while they impress upon us the evils of the injudicious use of these means, they teach us to be active and watchful in the use of those appliances which prevent prostration, or counteract it when present. Of the former, the most important is quinine, by preventing the exacerbation; of the latter, stimulants and

suitable nourishment, given at the appropriate time, — that is chiefly during the remission.

Additional practical remarks have already been made on this subject in my notice of the Symptoms.

Cerebral Affection.—We have found that this complication is a frequent and fatal one in the remittent fevers of sthenic Europeans, and also in the adynamic forms of the disease. I would refer to what has been said of the symptoms and pathology of this complication; and, bearing in mind all the remarks made under these heads, I proceed to consider the treatment. The headache, delirium, flushed countenance, associated with steady heat of surface, and pulse well developed and firm — present in sthenic Europeans — must be met during the exacerbation by freer detraction of blood, both general and local, the application of cold to the shaven head, free action of the bowels by mercurial purgatives; and the use of small doses of tartar emetic, when the state of the stomach will admit. But it is only in the very early exacerbations that we may hope to use these means with good effect. So soon as the pulse still increasing in frequency distinctly fails in strength, and the delirium becomes muttering, and alternates with tendency to drowsiness, the season for evacuants has passed,—their use will merely hasten the fatal issue. In bad remittents this state may come on as early as the fourth or fifth day of the attack, or earlier where the phenomena have been at all congestive at the commencement. Again, the remark made under the head Pathology, that undue depletion in the exacerbation sometimes leads to the development of head symptoms — muttering delirium, and tendency to drowsiness—at the close of a paroxysm, must be borne in mind.

These facts, which bring again before us the important truth of the marked tendency to prostration in this disease, and again point to the evils of undue depletion, are not, however, to be advanced as arguments against the use of evacuant means in appropriate circumstances. They teach us to be very watchful for the first symptoms of cerebral complication; to be very prompt, but not rash, in the application of our remedies. To observe with care their effect on the symptoms and on the pulse; to be very assiduous in the application of cold to the head, and to enjoin great quietude, and the removal of all sources of excitement. It is by attention to principles such as these that we may hope to secure those advantages which depletory treatment, used with judgment and caution, is most certainly capable of conferring, and to avoid those evils which will as surely result from its abuse in individuals of less sthenic constitution. The degree to which depletion, in appropriate circumstances, may be carried, must have relation to the state of the constitution. The relation of head symptoms, depending on cerebral determination to habits of intemperance, should also be recollected, for in such cases there is an additional reason for caution in the use of antiphlogistic means. Cases 28, 29, 30, 31, 33, are illustrative of this.

When the period for local detraction of blood has passed, but the head symptoms still continue—more particularly if they tend to drowsiness—then a blister*

* The blistering preparation which I have generally used was introduced into Hospitals in India on the recommendation of Dr. Donald Young in 1835, under the name of *Liquor Lyttæ*. It is considerably stronger than the *acetum cantharidis* of the *Pharmacopœia*. The latter preparation often fails.

may be applied to the nucha with advantage ; the time which should be selected for its application is the commencement of a remission, not the height of an exacerbation.

Such, then, are the means of treatment to be adopted when the cerebral symptoms are dependent on determination or congestion. They must be viewed in connexion with the principles elsewhere laid down for the treatment of the stage of exacerbation of uncomplicated remittents.

Head symptoms, dependent on inflammation of the membranes of the brain passing on to lymph effusion, are rare compared with those caused by other conditions. They are, I think, characterized by a milder delirium ; by a less degree of febrile reaction ; by a greater persistence of the symptoms during the remission ; by agitated movements of the hands and fingers, and occasional convulsion ; and are most likely to occur in the less sthenic states of constitution. They must be met by a just application of antiphlogistic therapeutic principles.

The muttering delirium and tendency to drowsiness coming on in more advanced stages of fever, and associated with adynamic phenomena, are to be controlled by means altogether different. We must treat the adynamia with appropriate stimulants and nourishment, and abstain from the use of all depressant remedies. When, however, the tendency to drowsiness begins to develop itself, the application of a small blister to the nucha, or, should that be inconvenient, to some part of the head, may be had recourse to. Under these means recovery not unfrequently takes place, particularly in youthful subjects.

The question now arises, may we not endea-

your to remove the pathological states of the brain, which cause head symptoms, by the induction of mercurial influence? Viewing the head symptoms apart from the fever which they complicate, mercurial influence is clearly contra-indicated in the adynamic form, as well as in that depending on determination or congestion of blood, with threatening serous effusion. It is not sanctioned by any reasonable therapeutic doctrine. But in that train of head symptoms depending on inflammation tending to pass on to lymph exudation, the induction of mercurial influence is suggested on theoretic grounds; and in occasional cases, in which the diagnosis is clear and the constitution suitable, it may be expedient to have recourse to it in the remission. Yet on the whole my judgment is opposed to it as a rule of practice, for the following reasons. Meningitis is rare, compared with other causes of head symptoms, in remittent fever, and when it does occur, is more common in asthenic than sthenic constitutions. It is often difficult to distinguish the symptoms depending upon it from those proceeding from other pathological states, for which mercury is either unnecessary or injurious. Moreover, I believe, that mercurial influence and the process of its induction very generally prove injurious to that state — the fever — of which the meningitis is the complication; and I hold it to be a pathological law, that whatever aggravates an idiopathic fever, must aggravate the local derangement which complicates it.

The general question of the mercurial treatment of remittent fever will be considered in a subsequent part of my observations. The question of the use of opiates has also reference to the management of head symptoms, and will be afterwards discussed.

My remarks on the treatment of this complication have hitherto had reference to the stage of febrile exa-

cerbation. When explaining the treatment of the complicated forms of intermittent fever, I took the opportunity of distinctly avowing my belief that whatever the complicating condition might be, the adequate exhibition of quinine during the period of intermission was the ruling indication. This is equally true of remittent fever. It matters not what the nature of the cerebral symptoms may be, the treatment of the febrile remission with adequate doses of quinine is a ruling indication. There has, I know, been very often doubt and hesitation in respect to the applicability of quinine to the remissions of fever with head complication; and I think it is a very fair suggestion to make, that part of the mortality from this complication may have been due to the want of the remedial benefit of this agent. It is almost unnecessary to add, that while we exhibit quinine we are not to neglect those other means which may be applicable to the cure and to the stage of remission.

Gastric Irritability.—The remarks made relative to the symptoms and pathology of this complication suggest the treatment. It should consist chiefly of local abstractions of blood from the epigastrium, to be followed by blisters when the further loss of blood is contra-indicated. As in the case of all the inflammatory complications of remittent fever, the stage of exacerbation is the appropriate period for leeching, that of remission for the application of blisters.

As another essential part of treatment, we must be very guarded in the use of mercurial preparations and purgatives, and should, on other grounds, the indication for their exhibition be pressing; then, after preliminary leeching in the exacerbation, we should use them in the remission rather than the exacerbation, and the calomel

should be combined with opium. Quinine must be adequately given in the remission, and it is most important on this account also so to manage the irritability of stomach during the exacerbation, as to render less likely the rejection of the quinine in the remission.

The question — whether large doses of calomel applied to the mucous membrane of the stomach in a state of determination of blood or of inflammation are sedative or not—will be subsequently considered.

Jaundice.—The coexistence of tenderness at the margin of the right ribs with jaundice, suggests the presence of inflammatory action, and our inquiries have shown that the mucous membrane of the duodenum and of the stomach is frequently the seat of the inflammation. Observation further teaches us that jaundice generally does not appear till several days after the commencement of the fever. These facts then suggest as respects the treatment, watchfulness for the first indication of tenderness below the right ribs, and on its appearance, without reference to the presence or not of jaundice, the adoption of the remedies for inflammation appropriate to the particular case, and abstinence from the use of those means which are likely to excite irritation in the mucous lining of the stomach and duodenum.

When jaundice is really present, the treatment should consist of the application of leeches or small blisters to the tender part below the right ribs; and the use of quinine during the remission, combined with small doses of aloes and mild mercurials, or small doses of sulphate of magnesia.

Of the 10 fatal cases which have been detailed by me (47. to 56.), there are 5 in which, judging from the colour of the liver, biliary congestion was present. In 3 the colour of the organ is not mentioned. In one it was streaked white. We may, therefore, I think, infer that

in cases of jaundice complicating remittent fever, the fault has not been in defective action of the hepatic cells, but has rather been owing to some obstacle to the passage of the bile from the liver. The occurrence of jaundice in cases of remittent fever in which there had been free use of calomel and purgatives, is a fact which has long been familiar to me. I deduce from these observations, and the two previously made, — that gastro-duodenitis is frequently present, and that jaundice is generally not a complication of the early stage of fever—that full doses of calomel, and the free use of purgatives, form no part of the treatment of remittent fever complicated with jaundice. On the contrary, they are likely to cause an aggravation of the symptoms; and to hurry on the period of prostration.

As a subsidiary means I have derived advantage from the use of saline diuretics, at the same time with the remedies already advised. They seemed to expedite the elimination of the biliary pigment from the blood.

Hepatitis.—I have already said that the complication of remittent fever with hepatitis, either in Europeans or natives, is, according to my observations, a rare occurrence. The only question which arises in respect to its treatment, is the expediency or not of inducing mercurial influence. On this point of practice I believe that the principles stated by me in respect to the treatment by this means of a complicating meningitis, are equally applicable to a complicating hepatitis.

The management of hepatic and splenic enlargement, coexisting with or subsequent to intermittent fever, has been fully explained. The same principles equally apply to these enlargements when coexisting with or consequent on remittent fever.

Dysentery.—The general principle which I have en-

deavoured to establish in respect to the treatment of all the complications of remittent fever, should be also observed in this particular one. While we treat the fever with quinine during the remissions, we must fulfil, in so far as it may be practicable, the indications which I shall have to explain elsewhere, as appropriate in the treatment of dysentery.

SECTION V.

TREATMENT FURTHER CONSIDERED IN REMARKS ON BLOODLETTING, AND THE MERCURIAL TREATMENT, WHICH IS FULLY DISCUSSED.—ON COLD AFFUSION AND WET SHEET PACKING.—ON PURGATIVES, EMETICS, BLISTERS, OPIATES, QUININE, DIET, AND CHANGE OF AIR.

General Bloodletting—In my observations on treatment I have endeavoured to explain that general blood-letting is an expedient and useful proceeding,—sometimes a very necessary one—in reducing the high vascular excitement of the early exacerbations of remittent fever in sthenic and lately arrived Europeans, as well as in lesser degrees of excitement, when there coexist in this state of constitution and stage of fever, considerable determinations of blood in organs important to life. These conditions are seldom present except in European troops shortly after their arrival in India. The extent to which bloodletting should be carried in appropriate cases is a point on which the physician must exercise his discretion—keeping in view the ultimate advantage of effecting the indication aimed at with as little loss of blood as practicable, and recollecting that the judicious removal of sources of irritation, the adoption of free ventilation, the well-timed use of emetics, cold affusion, tepid sponging, and antimonials, are all measures of considerable influence in lowering febrile excitement, and to which it is of very

essential consequence assiduously to have recourse, with the view of lessening the necessity of large evacuations. In the treatment of remittent fever in Europeans some time resident in India, and in all classes of the native community, general bloodletting is, with few exceptions, an unnecessary proceeding; and when so, if used, it can hardly fail to be injurious.

I have endeavoured, throughout these observations, to inculcate the following principles: that in the great majority of instances the danger of remittent fever consists in the risk of prostration of the important vital actions of the heart and nervous system; and that not only this, but also the protraction of the disease, is favoured by needless and undue evacuations. Further; that evacuant means used in the exacerbation have no power in shortening the duration of remittent fever.

The opportunity has at different times been afforded me of witnessing the treatment of the exacerbations of remittent fever by repeated venesection; and I have no doubt of its injurious tendency when thus used. It is true that the vascular action of the existing exacerbation may be lessened, and the symptoms depending on that action may be for the time alleviated; but the succeeding paroxysm recurs with not the less certainty; and after a time of depletory treatment has been passed, the febrile excitement becomes more severe and continuous, and with not unfrequently an aggravation of all the local complications.

This latter fact had also been observed by Pringle, who says: "But repeated bleedings, unless upon evident marks of a fixed inflammation, were so far from producing the desired effect, that they were apt to render the fever more obstinate." *

* Observations on the Diseases of the Army. London, 1765, p. 208.

Lind writes much to the same purpose: "This fever (remitting), unless brought to a speedy remission, is attended with considerable danger; and if large quantities of blood be repeatedly taken from patients labouring under it, by mistaking their disease for a true inflammatory fever, its obstinacy and fatality are greatly increased."*

Both Dr. Stokes and Mr. Twining, in their account of bloodletting in the cold stage of intermittent fever, have also observed a similar fact.

Dr. Stokes remarks: "From what I have seen I am disposed to conclude, that bleeding in the cold stage, when it does alter the type of intermittent fever, has a tendency to convert tertian into quotidian and quotidian into remittent or continued fever. I never saw any example of the converse, or in which quotidian was converted into tertian."†

Mr. Twining observes: "A remarkable fact may be here noticed, namely, that the employment of bloodletting in the cold stage of intermittent fever is occasionally, though rarely, followed by continued fever."‡

The practice of bloodletting in the cold stage of intermittent fever, first recommended nearly thirty years ago by Dr. Mackintosh of Edinburgh, was warmly advocated by Mr. Twining in his clinical illustrations of the diseases of Bengal. Though this mode of treatment is not, so far as I am aware, at present followed in any part of India, I cannot, on an important point of practice, pass unnoticed the opinion of one of our best au-

* Essay on Diseases Incidental to Europeans in Hot Climates. By James Lind, physician to the hospital at Haslar. 3rd Edition, London, 1777, p. 310.

† Edinburgh Medical and Surgical Journal, vol. xxxi. p. 13.

‡ Clinical illustrations of Diseases of Bengal. 2nd Edition, vol. ii. p. 233.

thorities on Indian disease. It is not my intention to enter into any examination of the principles on which this practice is advocated, or on the evidence on which its efficacy is supposed to rest. The perusal of Mr. Twining's remarks, in connexion with what I have myself written on the treatment of intermittent fever, will at once show the grounds of my distinct dissent from the course of treatment which he recommends.

The question was very ably inquired into by Dr. Stokes of Dublin in 1829; and the evidence on both sides has since been very fairly stated by Mr. Martin*, and a conclusion unfavourable to the practice has been drawn by him.

Dr. Stokes thus states the results of his observations :

"From the examination of these cases, I apprehend that an impression will be received certainly against the indiscriminate or even frequent use of bleeding in the cold stages of ague. It may be remarked that, in the great majority, quinine had to be administered before the disease was eradicated; that many of them had an extremely slow and dangerous convalescence; that in several instances the disease, so far from being relieved, appeared exasperated by the practice; that local inflammatory affections occurred several times after the operation; and lastly, that the bleeding appears to have a tendency to convert intermittent into continued fever. In one case, that of Casey, death from pneumonia and softening of the brain occurred. In none of my cases did any bad effects from sinking of the powers of life follow the practice immediately. But I am informed that in the practice of a highly respectable individual, there occurred two cases in which the patients did not recover from the collapse produced by bleeding in the cold stage. Those facts should make us very careful how we interfere with nature by means of the lancet, when we have so certain, and, as far as I have seen, so infallible a remedy as the sulphate of quinine." †

* On the influence of Tropical Climates, &c. By James Johnson and James Ranald Martin. 1841. P. 159.

† Edinburgh Medical and Surgical Journal, vol. xxxi. p. 17.

Calomel and other Mercurials. — I have already explained the circumstances under which calomel may be used with advantage in the treatment of remittent fever, with the view of increasing the excretions from the liver and intestinal canal.

The practice, at one time too common, of exhibiting calomel in doses of four or five grains three or four times in the course of the day, without any very definite object in view, and continuing it for a succession of days, cannot be too strongly discouraged. Not only is it unnecessary, but, for the following reasons, often positively injurious. In watching the progress of cases thus treated, it is not difficult to detect a train of symptoms much more fairly attributable to the treatment than to the disease, because it is in cases thus treated that this has been chiefly observed. The symptoms to which I allude are uneasy feelings, sometimes amounting to pain, with a sense of oppression or sinking at the epigastrium, and occasionally griping of the abdomen, for which leeches are not unfrequently applied, and purgatives unnecessarily given. The frequent repetition of the calomel keeps up also a foul state of the tongue, nausea and irritability of stomach, aggravates the febrile excitement, and produces an irritable state of the bowels, marked by frequent watery discharges. The convalescence of cases thus treated is always tedious, and frequently complicated with diarrhœa and clay-coloured dejections.

The question of the power of the constitutional effect of mercury to stop the febrile excitement of remittent fever, and the expediency of, at all hazards, endeavouring to produce it, has been much debated at different times. It was, when I entered on practice in India and for many years afterwards, an article of therapeutic faith;

and possibly it may be so still in some quarters. I shall first state the conclusions to which I have myself arrived on this question of practice, and the reasons upon which they are grounded; then notice the opinions of some other writers; and finally examine the origin of the practice and the nature of the experience which gave rise to it, and exercised so much influence upon the minds of others.

Case 4. convinced me, at an early period of my service in India, that the opinion then generally entertained, that mercurial influence was necessarily febrifuge in effect, was erroneous. The following cases and statements, drawn from other sources than my own experience, are confirmatory of this opinion:—

*57. “An officer in Guzerat was attacked with remittent fever on the 16th of June, he was salivated on the 18th, but the febrile state recurred and continued. The salivation ceased. The fever became adynamic with sense of great exhaustion. There was again a free exhibition of calomel and an inefficient use of quinine, finally delirium and death on the 23rd.”

The two next cases are extracted from Dr. Stovell's reports of the European General Hospital at Bombay, published in the ninth and tenth numbers of the Transactions of the Medical and Physical Society of Bombay.

*58. “Henry Edwards, thirty years of age, seaman of the Indian navy, was admitted on August 23rd, having been under treatment on board ship since the 16th of that month for remittent fever. Previous to admission he had been bled, leeches, cupped, and blistered; and had taken calomel, antimony, &c. When admitted he had a weak fluttering pulse of 130, irregular in its beat, but without the slightest irritability. His mouth was sore from mercury. Skin cool and moist. He was restless and constantly sighing. His bowels were irritable. He took ammonia digitalis, and beef tea, and had opiate enemata. For a time he seemed to improve; his pulse fell to 94, and slightly increased in volume, and his bowels became less

irritable; quinine was now added to the ammonia. He had no accession of fever till the evening of the 25th; it then assumed the typhoid character; sordes appeared on the lips and teeth, insensibility supervened, and he died on the 26th of the same month.

“*Inspection fourteen hours after death.*—*Head.* The brain and its membranes were perfectly healthy. The only abnormal appearance was very slight serous effusion into the left ventricle.—*Abdomen,* not examined, there being no abdominal symptoms during life.”

*59. “Stephen Lauchlan, seaman in the Indian navy, twenty-two years of age, was admitted on July 21st, having been under treatment since the 13th with remittent fever, on board the H. C. brig *Palinurus*. On admission, his skin was hot and dry; pulse 100, full; tongue dry, rough, and coated. He had some pain in the region of the liver, and his system had been affected with mercury. His gums were spongy, and his breath had a strong mercurial fœtor. Leeches were applied to the region of the liver, and he took antimony. On the 22nd there was complete remission; his pulse was 120 and small; his skin cool, but beginning to feel clammy; and his bowels irritable. He took ipecacuanha, quinine, and opium. Low delirium supervened; his abdomen became tympanitic; and he died on the 23rd.

“*Inspection seven hours after death.*—*Head.* Vessels on the surface of the brain much congested, and effusion of serum in the ventricles and at the base.—*Chest.* Viscera healthy.—*Abdomen.* Liver normal in size, but congested and bled profusely on being cut into; lining membrane of the colon thickened and discoloured in several places; other viscera healthy.”

Mr. Walbran, surgeon of the 4th Light Dragoons, thus writes of the fevers at Kaira in 1824, in the Reports to which I have on previous occasions alluded:—

“To affect the system with mercury, with the object of restoring the balance of the sanguiferous system, was always kept in view as a primary object. When ptyalism was induced, the patient generally recovered. There have been, however, instances in which the ptyalism had been free for some days, the evacuations had assumed a healthy colour, and every trace of fever had gone off, yet, notwithstanding the greatest care, the

ptyalism was checked, the patient immediately became anxious and restless; pulse quick and full; skin burning hot; restlessness and delirium supervened, and death followed in a few hours. This suppression of ptyalism taking place in the course of a few hours is not of very frequent occurrence in other fevers, and I can only account for it in the cases above alluded to by supposing that the inflammation of the villous coat of the stomach and intestines was incompatible with life, and the cessation of ptyalism was the forerunner of that state of the system previous to death."

If the diaries of fatal cases of remittent fever, treated on the mercurial plan, be carefully studied, it will be found that the prominent facts are a free use of calomel, persistence of febrile disturbance, and the non-induction of mercurial influence.

If, on the other hand, the diaries of recovered cases, treated on the same system, be considered, then the free use of calomel and the coincident occurrence of ptyalism and cessation of febrile disturbance will be frequently observed. This coincidence took place as a temporary event in the cases just quoted by me; but in them there was noticed also another coincidence, viz., recurrence of the fever and cessation of the ptyalism.

The mercurialist admits the difficulty of affecting the system with mercury during the presence of high febrile excitement; but when the coincidence of ptyalism and cessation of fever takes place, he looks upon the former as the cause, the latter the effect. And when there is coincidence of febrile recurrence and cessation of ptyalism, then the latter becomes the cause and the former the effect.

To my mind, this is altogether erroneous. I can state, from my own observation, that it is by no means an unusual circumstance, in the course of remittent fevers which in their early stages have required

the exhibition of several full doses of calomel, to observe, after the recurrence of the fever has been prevented by quinine, a slight mercurial action to appear on the second or third day; though not more than a few grains of calomel or blue pill in combination with quinine had been given during these days. Under these circumstances the relation of the events is so apparent and so expressive, that the question of which is antecedent and which sequence is no longer open for argument; and surely in other instances in which the only difference is that there has been no agency employed of acknowledged power to prevent the recurrence of the accession of fever, we ought to recollect the natural tendency of the disease to remit, and after a time to cease; and certainly ought not to take up the illogical position of attempting to account for the same coincident phenomena by altogether reversing the order of causation.

For these reasons, then, I am of opinion, that an endeavour to induce mercurial influence in remittent fever is erroneous in theory and of no value in practice. But the question is not thus easily disposed of. Not only is it erroneous in theory, and of no value in practice; but it is opposed to all rational theory, and very injurious in practice. If it be true that prostration of vital actions and deteriorated condition of the blood are pathological states to be much dreaded in remittent fever, and if mercury deteriorates the blood and favours prostration—on what principle of reasoning can it be supposed that induced mercurial influence can have any other than an injurious effect on remittent fever? I have, on several occasions, pointed out the tendency of malarious fever to produce a cachectic state of the system, and have endeavoured to enforce

the importance of our adding as little as possible to this state of constitution by the remedial means we adopt. To all who within the last twenty years have had the opportunity of extensively observing disease in India, in all classes of the European community; the asthenic state, the dyspeptic symptoms, the injured teeth, the pains of sides and loins, the habitually foul tongue, the constipated bowels, the pale alvine evacuations, the depressed spirits, and the sense of sinking at the epigastrium—all clearly traceable to the abuse of mercury—must be familiar facts.

Such then are the reasons, drawn from my own sphere of observation, which have led me to the conclusion, that the induction of mercurial influence in the treatment of malarious fever has been a great and grievous error in therapeutics. I now inquire whether other observers hold similar opinions.

Dr. Robert Jackson, in the year 1817, concludes his review of the mercurial treatment of fever in the following words* :—

“ Upon the whole, I venture to maintain, that if the results of what is termed mercurial treatment in fever, and even in dysentery, particularly in British military hospitals, where it has been most extensively employed, be candidly reviewed, the high, or rather the extravagant, opinion which has been, and which is even now, entertained of the salutary powers of that remedy, is not well supported. The advocates of mercurial treatment generally assert that no one dies from fever after salivation is fully established. The assertion is not altogether correct; but even if it were, and if it appear, on a reference to hospital case books, that there is one in three of the more concentrated forms of endemic fever in which calomel, given alone or in combination with opium, to the amount of a thousand grains or more, produces no increase of the salivary secretion, consequently does not produce the effect which controls

* Sketch of the History and Cure of Febrile Diseases, &c. By Robert Jackson, M.D., 1817, p. 243.

the fatal tendency of the disease; and further, if it appear, through the same channel of information, that the same disease, when left to its own course or opposed by ordinary means of treatment, does not destroy life in more than one case in three, the most prepossessed in favour of the remedy will not maintain that we gain anything by the experiment; and it is evident that, if we gain nothing certain, we lose time and chances of gain from other means. But though the effect of mercury, even where it does produce an increased discharge of the salivary secretion, is not uniformly decisive of the cure of fever; and though the action of the remedy, without artificial preparation, by bleeding or other means not implied in the plan of mercurial treatment, be extremely uncertain, the practice still holds its ground, and it probably will maintain it for many years to come. It hangs on a specious delusion, viz., the expectation of an effect considered as in some measure specific of cure. I abstain from further remark on the subject, only adding, that if the case be viewed without prepossession, and if the hospital returns of the person* who first adopted the practice at Grenada in the year 1793, and of those who have pursued a similar practice in the different military hospitals in the West Indies since that time, be admitted as documents of effect, the arguments for the continuance of it do not appear to be strong."

Dr. Copland observes :—

"Mercury†, pushed so far as to affect the mouth, or to produce *salivation*, has been considered both a prophylactic‡ and a

* Dr. Colin Chisholm is referred to by Dr. Jackson.

† Medical Dictionary, vol. i. p. 928.

‡ But the induction of mercurial influence has been looked upon as not only curative of malarious fever, but as also preventive of the action of malaria, and has been recommended as a prophylactic measure. It can hardly be necessary to observe, that the relation between debility as a predisposing, and malaria as an exciting cause, is well understood. It is irrational to suppose that debility caused by mercury can differ in this respect from that induced in any other way. On this question Dr. Copland remarks, "That mercury possesses no prophylactic influence against fevers has been satisfactorily shown by several able writers, and proved by my own experience. A person whose mouth was affected for the cure of syphilis was seized with malignant remittent fever in Africa, in 1817, and came under my care soon after the attack. He died a few days afterwards;

cure for fever. I have tried to affect the system in the most malignant forms of fever in warm climates without succeeding; and where I have succeeded, there was every reason to believe that recovery would have taken place nevertheless."

Mr. Martin, in the last edition of Dr. Johnson's work on tropical diseases, after a long and varied experience in India, says, "I have also seldom had occasion to urge mercury to the degree of salivation, during the whole period of my service in India."

Dr. Geddes, in his able "Clinical illustrations of the diseases of India," writing of eighty-seven cases of fever in the 1st Madras European regiment, treated with mercury, concludes his remarks with the following words* :—

"The number of those altogether in whom the disease was stopped before the affection of the mouth by mercury, amounted to 48; and of those in whom this circumstance took place after such an event to 28. From these facts, there is reason to doubt whether the mouth becoming affected is not rather a consequence of the cessation of the fever than the latter a result of the system having come under the influence of mercury; but in some chronic cases, where the contrary appeared to occur, an increase of frequency of the pulse, and of feverish irritation in the remissions, has been observed to take place in a gradual manner as the mercurial action showed itself; and this was considered to act by breaking in upon the habitual progress of the disease, which accordingly ceased to recur. In many instances, however, after a short interval of freedom from its attacks, these have returned before the affection of the mouth had entirely left the patient; and otherwise, it will be seen from the Table now alluded to, that 37 of those who had been under the influence of mercury in the earlier months of the season had been seized with relapses before its expiration. From these circumstances—combined with a considera-

the most active treatment having failed in developing vascular reaction and in supporting the vital powers. A nearly similar case is mentioned by Dr. Graves in his excellent lectures."—*Dictionary*, vol. i. p. 929.

* Page 189.

tion of the occasional affection of the bowels, often amounting to a dysenteric state, produced by the calomel; and of what has been mentioned in speaking of the prognosis regarding the lengthened sickness of the patient, in consequence of his sore mouth—the reader will readily form an opinion of the relative value of mercury and quinine in putting a stop to that tendency to febrile exacerbation which constitutes the main feature of the remittent and intermittent fevers of the East.”

I would now explain that my own conclusions have been arrived at quite independently of the opinions which have been just quoted. They were expressed in a paper published twelve years ago in the Transactions of the Bombay Medical and Physical Society, and have been expanded into the form in which they now stand in these pages, before I made special reference to the opinions of former writers.

I proceed to inquire into the origin of the mercurial treatment of fever in India. In the last quarter of the 18th century, hepatic affections in India were treated by the induction of mercurial influence, and Clark thought highly of the beneficial effects of a combination of calomel and opium in allaying intestinal irritation and promoting the intestinal secretions in malarious fevers; but I am not aware that in these latter diseases mercury had been much given to the extent of producing salivation, before it was used with this view, in Grenada in 1793, by Dr. Colin Chisholm.*

* P. 110.

† WADE, whose work was published in 1791, is mentioned, as one of the earliest writers on Indian disease who recommended the mercurial treatment of fever, by Dr. H. H. Goodeve, in his very interesting “Sketch of the Progress of European Medicine in the East,” published in April 1837 in the Quarterly Journal of the Medical and Physical Society of Calcutta. This sketch fairly represents the opinions of Bontius, Clark, Lind, and others, but from the too great prominence given to the phraseology of the time, it is evident that there was not a full appreciation of the merits of these eminent men.

The general introduction of this system of treatment into India must be traced to Dr. James Johnson's work on Tropical Diseases, first published in 1813.

At this period there were, as authorities on the treatment of remittent fever, Pringle, Cleghorn, and Jackson, who advocated the use of blood-letting and other evacuants, with bark during the remission. Clark and Lind, on the other hand, deriving their experience from observation in Bengal, in 1762 and 1773, of an adynamic type of the disease in seamen of a scorbutic taint, enjoined extreme caution in the use of blood-letting, and recommended a treatment consisting of the moderate use of purgatives, opiates, stimulants, and bark. Moreover, in Cullen's "First Lines of the Practice of Physic," there was open to the medical inquirer a philosophic statement of the principles which should regulate the treatment of the different forms and modifications of febrile disease. At this epoch Dr. James Johnson, at an early period of his professional life, arrived in the Hooghly in the month of September, after a short run of little more than three months

Indeed it could not be otherwise, for at the time when Dr. Goodeve wrote, medical opinion in regard to the treatment of tropical disease was in a very vacillating state. I feel assured, however, that I do not go beyond my knowledge of the present opinions and sentiments of the able author of this sketch—with whom for a long series of years I have enjoyed the privilege and advantage of a free interchange of opinion on this and kindred subjects—when I say that were he now to review the progress of European medicine in the East, the sketch would in some respects evince a different spirit. No one more early than Dr. Goodeve became satisfied of the evils of an excessive depletory and mercurial treatment, and of the advantages of quinine, in malarious fevers. No one, whether in medical practice or in the diffusion of medical education in India, has been more liberal in his judgment of others, or has co-operated with them in a freer and a franker spirit.

from England, in charge of a crew untainted, we may presume, with scurvy. He adopted, as he believed, Clark and Lind, as his practical guides, to the neglect it would seem, of all other authority and in forgetfulness of the circumstances under which these excellent physicians had observed the disease, and to which their recommendations of treatment exclusively applied.

Dr. Johnson* makes the following quotation from Dr. Clark: "As soon as the intestinal tubes have been thoroughly cleansed, the cure must *entirely* depend upon giving the Peruvian bark in as large doses as the patient's stomach will bear without paying *any regard to the remissions or exacerbations of the fever.*" He then continues, "such are the plain and easy instructions which Dr. Clark and Lind have left for our guides in this fearful endemic. They certainly are not apparently difficult to follow; and Heaven knows, I endeavoured, most religiously, to fulfil every iota of their injunctions; but with what success a single case will show."

It is true that Dr. Clark recommends the use of bark in the exacerbations, but it would have been just to that physician, had Dr. Johnson extended his quotation to the sentence which immediately follows that which he has cited, viz.:—"If the remissions be distinct, the bark, indeed, will have a more speedy effect in subduing the fever; but even if it become continual, by a regular and steady perseverance in the medicine, it will be effectually prevented from growing dangerous or malignant."†

It is evident from this sentence, as well as from a perusal of the cases recorded by Clark, that his practice

* On the Influence of Tropical Climates. By James Johnson. London, 1841, p. 107. The Italics are Dr. Johnson's.

† Observations on the Diseases which prevail in Long Voyages to Hot Countries. By John Clark, M.D. 2nd Edition, 1792, p. 184. vol. i.

was to give bark chiefly in the remission ; but to use it also in the exacerbation, in those cases which from the remittent had passed into the continued type.

Dr. Lind is represented by Dr. Johnson as holding the same opinion as Dr. Clark relative to the use of bark in the exacerbation. Such, however, does not appear to have been the case. Dr. Lind of Windsor, the author, referred to, of a "Treatise on the Putrid and Remitting Marsh Fever of Bengal," not only did not give bark in the exacerbations, but not even in the first remission. His words are, "For my part, I have always given the bark during the second remission, as all my care during the first was to cleanse the primæ viæ. But it is to no purpose to give the bark till the necessary purgations are over." *

I shall now quote that case in which Dr. Johnson believed that he was religiously endeavouring to fulfil every iota of the injunctions of Dr. Clark and Lind, and the ill success of which led him to abandon the therapeutic principles of a long line of able and observing men, and to promulgate a very different system of practice.

† "A young man of good constitution, in the prime of life and health, had been assisting, with several others, to navigate an Indiaman through the Hooghly. The day after he returned he was seized with the usual symptoms of this fever. I did not see him till the cold stage was past ; but the reaction was violent — the headache intense — skin burning hot — great oppression about the præcordia, with quick hard pulse — thirst and nausea. An emetic was prescribed, and towards the close of its operation discharged a quantity of ill-conditioned bile, both upwards and downwards : soon after which a perspiration broke out, the febrile symptoms subsided, and a remission, almost amounting to an intermission followed. I now with an air of confidence began to 'throw in' the bark, quite sanguine in my expectations of soon checking this formidable disease. But alas ! my triumph was of short duration ; for in a few hours the

* Page 65.

† P. 107. of edition of 1841.

fever returned with increased violence, and attended with such obstinate vomiting, that, although I tried to push on the bark through the paroxysm by the aid of opium, effervescing draughts, &c., it was all fruitless; for every dose was rejected the moment it was swallowed, and I was forced to abandon the only means by which I had hoped to curb the fury of the disease. The other methods which I tried need not be enumerated, they were temporizing shifts, calculated, in medical language, 'to obviate occasional symptoms.'

"The truth is, I knew not what to do; for the sudden and unexpected failure of that medicine on which I was taught to depend, completely embarrassed me, and before I could make up my mind to any feasible plan of treatment, my patient died on the third day of his illness, perfectly yellow — vomiting to the last a dark fluid resembling vitiated bile, and exhibiting an awful spectacle of the effects which a Bengal fever is capable of producing in so short a period on a European in the vigour of manhood!"

The body was examined after death, and Dr. Johnson found —

"The liver so gorged as it were with blood that it actually fell to pieces on handling it. Indeed, it appeared as if the greater number of the vessels had been broken down and almost the whole of the interior structure converted into a mass of extravasation. The gall-bladder contained a small quantity of bile, in colour and consistence resembling tar, and the ductus communis choledochus was so thickened in its coats and contracted in its diameter that a probe could scarcely be passed into it. Marks of incipient inflammation were visible in some parts of the small intestines, and the internal surface of the stomach exhibited similar appearances. The thorax was not examined on account of the time taken up in getting at the brain. Marks of turgescence in the venous system of vessels particularly, were there quite evident, and more than the usual quantity of lymph was found in the ventricles, but no appearance of actual inflammation."

The narration of this case is followed by remarks on the unsuitable character of the treatment, on the uncertainty of medicine, and the evils of being led by authority.

It is far from my desire to review in a critical spirit

the practice of one who, after a life of active usefulness, has passed away. Still it is impossible to avoid observing, that a dispassionate consideration of this case—upon which so much of the treatment of fever in India for quarter of a century has rested—and of the therapeutic principles of the best authorities in medicine of that day, must lead to the conclusion that these principles were not rightly appreciated or correctly applied by Dr. Johnson. To say nothing of Pringle, Cleghorn, Cullen, and Jackson, I cannot suppose that either Clark or Lind would have treated a case, even of the adynamic type with which they were familiar, in the manner which has just been detailed. Be that as it may, it is difficult to believe, that either of these observant and able men would have treated Remittent fever in a sthenic European after the fashion which has been attributed to them.

After this first failure, Dr. Johnson treated his subsequent cases by free bloodletting and alvine evacuations. But there were men of the crew who, from various circumstances, did not bear depletion so well as others. This led to treatment by induction of mercurial influence, by repeated doses—from five to ten grains—of calomel “as the *sine quâ non* in the medical treatment of this fever as well as many other fevers in the East.”*

Dr. Johnson’s treatment of remittent fever consisted, then, in free bloodletting and alvine evacuations, the use of opium combined with calomel † in large doses

* P. 110.

† The combination of calomel and opium—five grains of the former and one of the latter—was highly thought of by Dr. Clark, when the stomach was irritable and as favouring the subsequent action of mild purgatives. It would have been right on the part of Dr. Johnson, while condemning Dr. Clark, to have acknowledged the source from

when the stomach was irritable, the induction of mercurial influence, with subsidiary measures, as leeches and cold applications to the head — and neglect of the use of bark.

It appears, then, that on the authority of a single case — the first seen by a young naval medical officer in the Hooghly — the principles in respect to the use of bark in remittent fever, laid down from observations made in various countries and circumstances by Pringle, Cleg-horn, the two Linds, Clark, Cullen and Jackson, were ignored for quarter of a century by the medical profession in India ; and, I may add, in tropical countries generally.

In respect to the treatment recommended by Dr. Johnson we are left in ignorance of the amount of experience on which it was based. There is no statement of the length of his stay in the Hooghly, of the number of cases treated, or of the proportion of recoveries. But of this we may be certain, that the experience of a few months, in the crew of a single ship, could not be authority sufficient for that revolution in medical doctrine and practice which unfortunately flowed from it.

But, while we deplore this defection from sound principles and the evils which resulted from it, we must not be unjust to its author.

Dr. Johnson did not appreciate the circumstances under which remittent fever was observed by Clark and Lind. Neither have his followers in this respect been just to him.

Dr. Johnson says *, “ I now carried the evacuating plan with a high hand, and with much better success which he probably derived the calomel and opium part of his own treatment.

* P. 109.

than I expected. Fortunately for my patients, a great majority of them were fresh from Europe, and high in previous health and strength; these recovered wonderfully after bleeding and evacuations, though not always." Again*: "The fear of debility and putrescency still paralyzes the arms of medical men in hot climates, notwithstanding the clearest evidence in favour of general and local bleeding, particularly where the subject is lately from Europe and not broken down by the climate."

Yet — notwithstanding these clear indications that a system of treatment based at best on a very limited experience, could only be fortunately followed in fresh Europeans high in previous health and strength, and not broken down by climate — the followers of Dr. Johnson have applied the treatment to the long resident as well as to the fresh arrival, and to natives asthenic in various degrees, as well as to sthenic Europeans.

But some explanation is now necessary for the details into which I have entered relative to a mode of practice now very generally disapproved of, and one which its talented author had himself virtually abandoned before the close of his long and useful career — as we learn from the following expressions written in 1841: —

† "It is necessary to observe, also, that the fevers, even of the same place are not of the same type in all years; and consequently they require modifications of treatment. The above was the nature of the fever on the banks of the Ganges thirty-five years ago, and the general mode of treatment described was found most beneficial. I have no doubt, however, that fevers in such places will often be effectually combated by early depletion, especially purging, and then when a remission takes place by administering bark, particularly the quinine, so as to prevent the return of the paroxysms. Particular organs are to be guarded by local bloodletting and blistering, while the glandular secretions of the chylopoietic viscera are to be kept in order by appropriate doses of calomel or the quicksilver pill."

* P. 110.

† P. 113.

My reasons for having enlarged on this subject are—

1st. The impressiveness of the lesson which it teaches. The caution which it enjoins against accepting new systems of treatment without a careful examination of the evidence and of the principles on which they rest. The practice of medicine will never be free from the risk of errors of this kind, unless all who exercise it give their minds to patient observation and the study of principles ; and are fully impressed with the responsibility which it involves.

2nd. In the second number of the Indian Annals of Medicine*, there is a paper on Tropical Fever and Dysentery by Mr. Hare. He speaks with much truth of the opinions of several of the older physicians, and also enters on those historical details with which we have just been engaged.

But in Mr. Hare's communication I find the following observations, from which, after the opinions expressed in various parts of this work, I need hardly say that I altogether dissent :—

* “ There cannot be a doubt, that if not calomel, yet certainly salivation, is an antidote to malarious fever. The instant a patient's mouth is sore, the fever leaves him ; the mercury produces not the slightest effect till then, but from that moment the disease vanishes as if charmed ; the change is from death to life, from extremity of suffering to calm and comfort.

Again :—

“ Numerous instances too of the safety which salivation gives from the effects of the malarious poison, may be found in Dr. Johnson's book ; viz., patients salivated for syphilis sleeping with impunity in places which were fatal to every one of their companions ; and also many cases are on record of officers in India passing in a state of salivation by dâk, unharmed through the most deadly jungles.”

* April, 1854.

† The Indian Annals of medicine, No. ii. p. 468 and 469.

It is this revival at the present day of doctrines from whose evil influence the practice of medicine has too slowly emerged, that has induced me to deviate from the course which I pursued in 1843, when writing on this disease.* Then I assumed that the necessity of discussing the question of the treatment of remittent fever by mercurial induction had passed away.

I have now to notice the question of the *supposed sedative influence of large doses of calomel* on the mucous membrane of the stomach, first, I believe, advanced by Sir James Annesley, and then adopted by many writers on materia medica and on tropical disease.

Annesley's opinion was founded on the results of some experiments which he performed on dogs. In the year 1841 Mr. Murray, at the time surgeon of the convalescent station on the Mahabuleshwur Hills, and well known to his professional brethren in India as a zealous and successful cultivator of medical science, published in the fourth number of the Transactions of the Medical and Physical Society of Bombay a paper titled "Experiments illustrative of the Physiological Effects of Calomel on the Gastro-Intestinal Mucous Membrane of Dogs."

This paper corrects Annesley's erroneous conclusions. The results arrived at by Mr. Murray are very important; but they would seem not to be generally known to recent writers on materia medica.† For these reasons I shall in this place quote the conclusions drawn by Mr. Murray from his experiments,

* Transactions, Medical and Physical Society of Bombay, No. vi. p. 199.

† They are not adverted to even in the last edition of Pereira's *Materia Medica*, completed in 1853.

and elsewhere* in this work record the experiments themselves.†

Mr. Murray, after stating the objections that may be urged generally against therapeutic inferences drawn from experiments made on the lower animals and in the state of health, continues in the following words :—

“But, should they serve no other useful purpose, they may perhaps be considered to possess the negative merit of testing the accuracy of some similar experiments performed by Mr. Annesley, which, having been extensively applied by the author to the treatment of Indian diseases, have probably exerted a considerable degree of influence on medical practice in this country.

“The operation of mercury is stated by writers on *materia medica*, to be that of a general stimulant, exerting its action more especially on the glandular and absorbent systems, and promoting the secretions of the liver, bowels, skin, and salivary glands.‡ But, so far as I know, the direct anatomical effects of calomel on the capillary circulation of the gastro-intestinal mucous membrane had not been made the subject of experimental inquiry until Mr. Annesley instituted some experiments on dogs in 1823, from the results of which he drew the following inferences :—1st. That the natural and healthy state of the stomach and intestinal canal in dogs is that of high vascularity.

* See Appendix.

† Since these remarks were penned, this estimable and able writer has closed his career of usefulness, after retirement from the service which his talents and his virtues had adorned. In addition to the paper from which these extracts have been taken, Mr. Murray contributed many excellent communications to the “Transactions of the Medical and Physical Society,” on the Climate of Mahabuleshwur ; on the Hill Climates of India ; on Lunar Agency in Disease ; on the Climate and Diseases of Sattara ; on the Use of Calomel, &c. These contributions to medical science are characterized by the calm and philosophic spirit in which they are conceived and the judgment with which they are executed.

Such is a faint tribute to the public character of my friend : these pages are not the fitting place for the record of his private virtues.

‡ Murray's *Materia Medica*, 3rd Edition, vol. i. p. 195. — Thomson's *London Dispensatory*, Art. Hydrargyrum.

—2nd. That calomel, when administered in large doses, diminishes the vascularity of the mucous surface of the stomach. — 3rd. That it excites the arterial capillaries in the mucous coat of the colon.—4th. That it attenuates and detaches the mucous secretions from the intestinal surfaces to which they adhere.*

“The results of these experiments are considered by Mr. Pereira † to be so improbable, that without further evidence he refuses to admit their accuracy; while, on the other hand, they are quoted by Dr. Copland as having ‘determined a most important fact,’ and as having ‘explained the results of clinical observation.’ ‡ From the existence of so remarkable a discrepancy of opinion on the subject between two principal authorities in therapeutics and practical medicine, the theory of the local operation of calomel may be considered as still open for further investigation.

“While I append to this paper a detailed account of the experiments which I have recently instituted on this subject, in the order and form in which they were originally made and recorded, it will be sufficient to introduce here a tabular analysis of them, commencing with those intended to illustrate the natural appearance of the organs, and arranging the others according to the quantities of calomel given in each instance, but retaining the original numbers so as to admit of a ready reference to the more detailed account.

“It will be observed that the dogs were put to death in three different ways — by hanging, drowning, and shooting in the head. The first of these modes of death, from its tendency to produce vascular congestion, would not have been resorted to, had it not been the one adopted by Mr. Annesley, the verification of whose experiments was one of the objects which I had in view. Care was taken that the dogs should not be killed during the process of digestion.” §

Omitting the tabular analysis referred to by Mr.

* Annesley's *Sketches of Indian Diseases*, p. 395. 397. 400. 405.

† Pereira's *Lectures on Materia Medica*, *Medical Gazette*, vol. xviii. p. 468.

‡ Copland's *Dictionary of Practical Medicine*, Art. *Dysentery*, vol. i. p. 731.

§ I acknowledge, with pleasure, my obligations to Dr. Waller for his kind assistance in conducting several of the experiments referred to.

Murray, I quote the conclusions which appear to him to be deducible from the series of experiments:—

“1st. When administered to dogs in doses of from five to thirty grains, calomel occasions, in a less or greater degree, a preternatural afflux of blood to the minute arteries and capillaries of the gastro-intestinal (more particularly the gastric and colic) mucous membrane, imparting to that tissue a capilliform, punctiform, or uniform red tinge. This increased vascularity, which is slightly marked after doses of five and ten grains (Experiments xii. xiii. and xiv.), becomes more perceptible in doses of twenty and thirty grains, and is accompanied with more or less sanguineous effusion on the mucous surface, either in dots (like bleeding points) or in small streaks or patches (Experiments v. xi.).

“2nd. In the above-mentioned doses it increases the flow of bile into the duodenum; and

“3rd. It increases the secretion from the intestinal mucous follicles and serous exhalants.

“4th. When administered in doses of one, two, and three drachms, it produces, in addition to a greater amount of the preceding effects, capilliform injection of the peritoneal coat of the stomach and bowels, and alters, as well as increases, their internal secretions, occasioning a sanguineous, or dark grumous, or sanious, or sero-albuminous effusion on the inner surface of the bowels, particularly of the colon (Experiments ii. iv. vii. xv. vi. ix.). In one experiment (ix.) all these different kinds of secretion (resembling the appearances in acute dysentery) were found in the small intestines of the same dog, and must have been of recent formation, as they had not passed into the colon. Under the influence of these doses also bile flows into the cavity of the stomach.

“These results appear to me conclusively to establish, that calomel excites and increases, and, under certain circumstances modifies, the physiological actions of the minute arteries, capillaries, and secretory vessels of the gastro-enteric mucous membrane; and that these effects are in some degree proportioned to the largeness of the dose administered.

“The apparent discrepancy between the results of these experiments and those obtained on a more limited scale by Mr. Annesley, in regard to the stimulant or sedative action of calomel on the capillary blood-vessels of the gastric mucous membrane (for there is an exact correspondence of result regarding its action on the colon) appears to be partly attributable

to that author's having inferred, from two experiments, that the natural and healthy state of the stomach and bowels is that of high vascularity—an opinion which is opposed, I believe, to that of almost all anatomists, and is directly at variance with experiments i. iii. and viii. The discrepancy in reference to its operation on the intestinal mucous secretion is, perhaps, more a difference of interpretation than any real discrepancy of results. Mr. Annesley having attributed to calomel the property of chemically dissolving and detaching the mucous from the surface to which it adheres, while I have seen reason to believe that it stimulates the mucous and serous exhalants to a preternatural increase of their secretion, which combines with, and dilutes, the inspissated mucus previously lodged in the bowels.”

On the faith of Mr. Murray's experiments and of my own clinical observations, I entertain the belief that calomel, in all doses, exercises an irritant action on the gastro-intestinal mucous lining, which should be borne in mind whenever we use this remedy.*

I shall conclude my remarks on this subject by narrating a case which came under my observation when serving in the hospital of the Bombay European Regiment at Bombay. It may be viewed in connexion with Mr. Murray's fourth conclusion from his experiments:—

60. Private William Todd, aged twenty-nine. Admitted into the Hospital of the Bombay European Regiment, October 28. 1829, ill with fever; there was much headache, with full and frequent pulse. He became drowsy, the skin assumed a yellow tint, he sunk and died November 1st. On the 29th he shrunk on the abdomen being pressed; but there was no purging except from the use of medicine. About 100 grains of calomel were given during the three days preceding death.

Inspection.—Vascularity of the membranes of the brain and effusion of patches of lymph. The greater part of the mucous surface of the large intestines was covered with a dark red

* That a full dose of calomel combined with one or two grains of opium is often retained on the stomach and with advantage where other medicines are rejected, is quite true. In this there is no evidence of a sedative action from the calomel, but evidence of what has never been doubted—the counteracting effect of opium.

effusion, in some places loosely attached to the membrane, and having the appearance of red currant jelly; in other places the effusion was firmer in consistence and could be peeled from the mucous tunic in an almost membranous form. In the cœcum the effusion was evidently of longer standing from its firmer consistence and from its being connected with the subjacent mucous tissue through the medium of what appeared to be small capillary vessels. The mucous membrane underneath the effusion was vascular.

Cold Affusion—applied in those cases and that stage of the paroxysm in which the skin is dry and steadily above the natural temperature, and the pulse of good volume, is of very great use, by lessening the vascular excitement, and, when the head is the organ affected, alleviating the headache, and either doing away with the necessity of applying leeches, or reducing considerably the number required.

The use of this remedial measure is contra-indicated in fever as in other diseases, when there is complication of pectoral affection, and also probably when gastro-enteric symptoms are present; though on this latter point I do not write with certainty, because it is not improbable that, in a climate with a mean temperature of 80°, the affusion of water not artificially cooled may not be attended with the same risk, as the use of cold affusion in extra-tropical countries. But still, even if only confined to the cases in which head symptoms are the prominent local complication, it will be useful in a great many instances,—for these we have found form a very considerable proportion of the remittents in Europeans, to which class my experience of the cold affusion has been chiefly confined.

When the use of cold affusion is doubtful, or when the suitable period of the disease or the appropriate stage of the paroxysm has passed, tepid sponging may be had recourse to with very good effect

whenever the skin is above the natural temperature. And in all cases of remittent fever extending to two or three paroxysms, in which the vascular excitement during the stage of exacerbation is considerable, or in which the head is affected, the scalp should be shaved, and cold applications be assiduously used.

Within the last few years the treatment of remittent fever and other acute forms of disease by the use of the *wet sheet*, has at different times been brought under my notice in India; and it has seemed to me, that injury to medical practice is not unlikely to arise from its routine and injudicious adoption.

I have applied it in a few cases, and have watched its use by others in a greater number. The following are the conclusions at which I have arrived:—

1. In the conditions which justify the use of cold affusion, it is possible enough, that the application of the wet-sheet, renewed every ten minutes or quarter of an hour for two or three times, may be a convenient and effective manner of reducing the temperature of the body; but on this point I cannot 'speak from experience. Should there be tendency to hepatic or splenic congestion, then the wet sheet used in the manner above stated is likely to do harm by increasing the congestion. This statement is made from personal observation.

2. The treatment of the exacerbation of remittent fever, at its height, by wet-sheet packing after the manner of the hydropathic system, has been to my knowledge adopted in some cases. Without denying that the moisture of the surface of the body may somewhat modify the action, there can be little doubt, that this mode of treating fever is decidedly a retrograde movement towards that sweating system, which, nearly two centuries ago, the genius of Sydenham banished from the

practice of medicine. But even if it can be shown that wet-sheet packing is useful in lessening the exacerbation of remittent fever, surely it is well understood that this is not a leading indication in the cure of the disease; and that means which merely aim at this end can never occupy other than a subsidiary position.

3. If wet-sheet packing be used towards the close of an exacerbation, when the circumstances have been such as to render undue collapse at this period an event not improbable, then there can be no doubt that increased diaphoresis from wet-sheet packing will increase the exhaustion, and may produce it when it otherwise would not have occurred. I have never witnessed this effect from the wet-sheet in remittent fever; but I have observed it in the treatment of tetanus — another disease in which a tendency to death by failure of the action of the heart is also well marked. In the case alluded to, death was undoubtedly hastened by the remedy.

4. A routine system of wet-sheet packing, by directing the chief curative means to the reduction of febrile heat, must tend to withdraw attention from the sedulous use of those methods by which local inflammation or other disease may be detected. It is opposed to careful and accurate diagnosis. Then in regard to the diaphoretic action of the wet sheet in the treatment of disease, there can be no doubt of the advantage of making the skin perform its share of increased excretory function when increased excretion becomes an indication of cure; but can there be a greater error in practice than that of acting on the skin alone, and neglecting the other important excretory organs?

These are not theoretic objections. I have witnessed the diagnosis of local inflammation overlooked, and the

symptomatic fever treated by wet sheets to the neglect of the inflammation — under circumstances in which I felt myself quite justified, from previous experience, in concluding that treatment conducted on generally received principles, and by ordinary means, would have led to a different course and issue of the disease.

On the Use of Purgatives.—Of the necessity in remittent fever of the moderate use of purgatives, more or less active according to the circumstances of particular cases, no question can arise; but, at the same time, the bad effect of keeping up a constant state of irritation of the intestinal mucous lining is equally certain.

After the first two or three days, if the secretions dependent directly or indirectly on the portal system have been freely solicited, further purging is unnecessary. It will be sufficient that the bowels are moved once gently in the course of twenty-four hours. The effect of the opposite and too common practice is to irritate the mucous linings, to hurry on and very much aggravate the adynamic symptoms, in protracted cases, and, in recoveries, to leave, during the state of convalescence, a sluggish and deranged condition of the bowels. Lastly, it creates a decided proclivity to attacks of dysentery, which are very likely to be excited, if the approach of the cold season finds the patient feeble, reduced, and still in a state of convalescence.

The question of whether purgatives should be given during the exacerbation or the remission of remittent fever, is a very important one to be determined. In the Medico-Topographical Report of the Presidency division of the army, published by the Medical Board of Madras, a very decided opinion on this point is

recorded by the surgeon of the Presidency General Hospital. He is opposed to the use of purgatives in the exacerbation, because they do not act readily, and they tend to perpetuate the exacerbation and interfere with the access of the remission. There is much practical truth in this remark, but it is hardly sufficiently precise and discriminating.

There can be no doubt that a state of febrile disturbance is adverse to the action of all remedies, purgatives included. It is also true that the too free use of purgatives favours the continuance of the exacerbation and interferes with the remission, partly from undue evacuation, and partly from irritation of the intestinal mucous lining. This influence is most likely to occur in asthenic constitutions.

In the fevers of sthenic individuals, however, evacuation by purgatives is had recourse to with the view of lessening the vascular action of the exacerbation. If this be a correct indication for their occasional use, it is evident that it can only be carried into effect by their exhibition during the exacerbation itself. But in following out the other indications for which purgatives are used, as removing constipation or correcting deranged secretions, the remission is the suitable period for their exhibition. They should be given in moderate doses early in the remission; and probably there is no better way of using them than by combination with the first doses of quinine in the manner elsewhere recommended by me.

On this question there are the following practical remarks in Dr. Geddes' Clinical Illustrations* :—

“Aided by the employment of such means†, if deemed

* Clinical Illustrations of the Diseases of India, p. 173.

† Occasional venesection, leeches, antimonials, and opiates are referred to.

necessary, the last stage of the febrile paroxysm began to show itself; and the first object of treatment, at this period, was to carry the declining stage of the disease on to as much of an intermission as was possible. For this purpose, the natural evacuation from the skin, which had hitherto been checked, becomes restored and increased in quantity, by the effort of the constitution; and it is at the same time that the action of a purgative when necessary has been considered most proper.* When this has been exhibited at a later period of the intermission or remission of the fever, an early exacerbation of the disease has frequently been the consequence; and when given, so that its operation has taken place during the existence of the hot stage of the disease, this has always appeared increased by it, and a deeper fur been afterwards found on the tongue. When constipation, therefore, has existed on the admission of the patient to hospital, or at any other time during his stay there, or when the heat of skin did not, in a great degree, leave the surface at an early period of the remission, a purgative was exhibited; and invariably, so that its operation should go on along with the process of decline of the febrile symptoms."

Emetics. — The utility of emetics in the early stage of fever, and the circumstances for which they are suitable, have been already explained; and I would here chiefly allude to a manner of giving ipecacuanha as an emetic, which I first saw practised by Dr. French — formerly of Her Majesty's 49th Regiment, but at the time (1832) to which I allude in medical charge of the 4th Light Dragoons—which I have on occasions followed, and which I conceive to be well suited for particular cases. It consists of a combination of ten or fifteen grains of ipecacuanha with ten grains of calomel, followed, after two or three hours, by a purgative. This combination very generally causes vomiting; and it is assumed that the calomel is retained by being en-

* As Dr. Geddes does not advise the purgative till the remission has fairly occurred and the risk of collapse at the close of the exacerbation has passed, it is hardly necessary again to inculcate caution on this score.

tangled in the mucus of the stomach. The advantage obtained is, that in cases in which an emetic, a mercurial, and a purgative are expedient as initiatory proceedings, there is a gain in point of time by combining the mercurial with the ipecacuanha. The kind of case for which this treatment is suited is that in which the tongue is expanded, thickly coated, without floridity of tip or edges, and unattended with tension or tenderness of the epigastrium.

But cases exactly answering to this description are not very frequent in Bombay; for more generally in the slighter attacks the tongue is expanded, white, and thinly coated; and in these the ipecacuanha alone, as an emetic, followed after some hours at bed-time by two or three grains of calomel with antimonial powder or by blue pill with ipecacuanha, and the next morning by a mild purgative, will be found sufficient. Then there are the other severer cases in which the tongue is more coated but not so expanded, and in which the tip and edges are florid, and the epigastrium uneasy on pressure. In these, though a free dose of calomel may in many instances be fairly indicated, the emetic is contra-indicated, and the calomel ought to be combined with opium and very frequently to be preceded by the application of leeches, a sinapism or blister, to the epigastrium, according to the period of the disease. It is on these grounds, that, though thinking favourably of Dr. French's formula, I have not often found it expedient to have recourse to it in the treatment of fever in Bombay.

The treatment of fevers by an emeto-purgative mixture of tartar emetic and epsom salts in doses frequently repeated, to the causing of free vomiting and purging, is quite unsuited to febrile disease as occurring in

Bombay, and I am certain cannot be anywhere generally adopted as a routine system of practice without great hazard. In fact, even in the quotidian and ephemeral fevers of more phlogistic type, occurring in the Deccan at the commencement of the monsoon, and in well-conditioned Europeans, I have witnessed an alarming state of collapse resembling cholera caused by this mode of treatment. It is not disputed that many cases of fever, thus managed, recover well, but they must be selected with care; for I believe that there never occurs an epidemic of tropical fever in which there are not many cases for which this kind of treatment is not only unsuited, but is also very dangerous.

Blisters. — I have already adverted to blisters applied with the intention of controlling local capillary derangement when the stage appropriate for topical blood-letting has passed; and I would only here repeat, what has already been previously stated, that when blisters are used in remittent fever, the stage of remission is that which is most suitable.

On the use of Opiates. — In my remarks on the treatment of ordinary remittent fever I have endeavoured to explain the circumstances in which an opiate has seemed to me to act with advantage, and also the precautions which should be kept in view at the time of its exhibition. At the period when this practice was followed by me in the European General Hospital, I was not aware that Lind* had used opium still more freely and with less precaution in the hot stage of intermittent fever. His belief was, that, given early, it shortened the duration of the hot stage, and favoured the access of the third stage and

* Lind's Essay on Diseases incidental to Europeans in Hot Climates, 1847, p. 343.

of the intermission. He did not give opium when delirium was present, but considered that headache was no contra-indication to its use.

Whether the favourable opinion entertained by this high authority in tropical fevers, of the beneficial effects of this free use of opium, be just or not, I am unable to judge from experience. As already explained, I have always, before giving opiates in the hot stage of fever, had recourse to certain precautionary means for reducing general and cerebral vascular action; these I still think must be very expedient. But, whatever view be taken of Lind's opinions, I am certain that there are other circumstances of fever, in some respects analogous, in which a full dose of opium cannot be given without much hazard. I allude to its use after a lengthened period of restlessness, in which the skin is not steadily warm or rather is coldish, and in which the pulse is frequent and feeble. This state obtains either in cases which have been for some time protracted, or at the end of a paroxysm characterized by much collapse. These symptoms indicate that the nervous influence over the organs of circulation is failing, and the sedative action of a *full* opiate, under these circumstances, is apt, as I have in one or two instances witnessed*, to increase the state of collapse, to mask the degree in which it exists, to hurry on coma and expedite the fatal termination. Such cases should be treated by the assiduous use of stimulants.

Again, when in the remittent fevers of the interperate, there are present delirium and tremors with slight febrile heat and a pulse frequent and compressible, there is—in consequence of the resemblance of these symptoms to those of delirium tremens and

* Case No. 20.

of the erroneous views entertained on the treatment of this latter disease, — often great temptation to give opiates to *overcome* the delirium and to cause sleep. This is, I am convinced, in general, a most hazardous and not unfrequently a fatal proceeding, as is illustrated by cases 33, 34, 35. It is very probable that in the treatment of such cases the exhibition of quarter-grain doses of tartar emetic, with five minims of tincture of opium, on the principles advocated by Dr. Graves, in the management of some forms of delirium in European continued fever, may prove an appropriate and useful means.

The subject of the exhibition of opium in remittent fever is, indeed, most important, for the cases which have been above specially alluded to, are not the only instances of error which I have myself witnessed ; and others have been noted by me in the perusal of the diaries of cases which had not come under my own observation. These circumstances have particularly fixed my attention on this question of practice, and after much reflection it has seemed to me that the following are the principles which should be kept in view in using full opiates in remittent fever.

1st. I assume that opium, in remittent fever, is thought of only when there is restlessness and want of sleep ; and that it can be used with safety only in the early stage, when there are not symptoms of marked determination to the brain, and when the pulse is of good volume, and soft, and not much above 100.

2nd. When remittent fever has endured for six or seven days, each recurring exacerbation is attended with an increasing frequency and decreasing strength of the pulse. This depression of the heart's action is most observable towards the close of the paroxysm, and

is not unfrequently attended with general restlessness. When so, the temptation to give an opiate is often great, in the hope that sleep and its consequent advantages may be secured. But, under such circumstances, it is, I believe, always a hazardous proceeding. A pulse that ranges towards 120, or one not so frequent, but feeble and compressible; or still more, a pulse that has the frequency of 120, and is, at the same time, feeble and compressible, are conditions which may be held to contra-indicate the use of a full opiate — even though they should not be associated with headache, wandering, delirium, or tendency to drowsiness. Nor is it difficult to understand why this should be. These conditions of the pulse indicate that the tendency to death is by syncope—a tendency sure to be most marked towards the close of the paroxysm, and to increase with each returning accession of fever. In this depressed state of the heart's action, the functions of the brain also tend to be defective, and, under the influence of a full opiate, are not unlikely to be suspended. In other words, the opiate is likely to induce coma, and its sedative influence on the brain, acting through the nervous system, still further depresses the action of the heart; and thus, under these circumstances, an opiate injudiciously given favours death both in the way of syncope and coma.

3rd. As yet I have assumed no derangement of the brain itself. But in a great proportion of cases of remittent fever, of six or seven days' duration, the earlier exacerbations are marked by flushing and headache, the later ones by slight wandering or tendency to drowsiness. This state of the cerebral functions, *whatever the state of the pulse may be*, contra-indicates the use of opium. In such cases of fever the tendency to death is by coma. If the opiate be given at the close of the

earlier paroxysms, it may only increase the restlessness; but if it be given at the close of the later paroxysms, when wandering or tendency to drowsiness is present, it will most surely expedite the supervention of coma. It ought to be most scrupulously abstained from.

4th. But in those cases of remittent fever in which the wandering delirium, or drowsiness of the later paroxysms shows a tendency to death by coma, there is also, most generally speaking, a frequent and failing pulse. Whenever an exacerbation of remittent fever has been attended with wandering, or delirium, or a tendency to drowsiness, and terminates with a quick and feeble pulse, it may be inferred with tolerable certainty, that a fatal termination by coma is not far distant, is only to be warded off by the most judicious management, and is most certain to be hurried on if we commit the grievous error of attempting, under these circumstances, to lessen the delirium and restlessness by the exhibition of opium. To conclude then, whenever in remittent fever the pulse is towards 120, feeble and compressible; whenever there is wandering delirium, or slight drowsiness, the exhibition of a full opiate is a measure of danger, more particularly towards the close of a febrile exacerbation. In other words, whenever in remittent fever the tendency to death by asthenia or by coma is well marked *, a full opiate will expedite the fatal result.

* I need hardly observe, that in these remarks, I refer exclusively to opiates given with the intention of, and in doses calculated to produce the soporific action of the drug. Whether opiates given in small doses with a view to their stimulant effects, may or may not be admissible in some of the states of fever adverted to by me, is a question altogether apart from my present subject, and one in regard to which I am unable to express any opinion from experience.

On the Use of Quinine—I have already fully detailed the manner in which quinine has been used by me in the treatment of intermittent and remittent fever.

On examination it will be found that the principles differ little from those of the older writers, chiefly the Linds* and Cleghorn, in respect to bark.

Cleghorn remarks: "Inflammations of the abdominal viscera are likewise natural effects of tertian fevers. For we find that they often come on little by little, and increase with every paroxysm till at last they end in a gangrene. Whereas the cortex, by bringing the fever to a speedy conclusion, impedes the further progress of the inflammation, so that it afterwards goes off gradually of its own accord; as I have had occasion to observe in a multitude of instances, where acute fixed pains, tension, and other symptoms made the nature of the disease too plain to be doubted." Again: "Upon the whole I am convinced that the unhappy metastases, which some have observed to follow the use of the bark, are exceeding rare, and ought rather to be ascribed to other causes than to this medicine. And I will venture to affirm that more bad consequences ensue from giving it too late than too soon. Prostration of the strength, sudden death, or the most obstinate chronic diseases, if the sick recover, being the usual effects of delay. Whereas the worst that commonly happens from the too early use of it is that it does not at once restrain the paroxysms, like a charm without any sensible evacuation as it frequently does when given after the fever

* I may here state that there are two Dr. James Lind's; one of Haslar Hospital, who writes on scurvy and diseases incidental to Europeans in Hot Climates. The other, Dr. James Lind of Windsor, who writes on putrid and remitting marsh fever of Bengal.

has arrived naturally to its height, and begins to decline of its own accord." *

The following are the rules laid down by Cullen †: —

"1. That the bark may be employed with safety at any period of intermittent fevers, providing that, at the same time, there be neither a phlogistic diathesis prevailing in the system, nor any considerable or fixed congestion present in the abdominal viscera.

"2. The proper time for exhibiting the bark in intermittent fevers, is during the time of intermission, and where intermissions are to be expected, it is to be abstained from in the time of paroxysms.

"3. In remittents, though no entire apyrexia occurs, the bark may be given during the remissions; and it should be given, even though the remissions be inconsiderable, if, from the known nature of the epidemic, intermissions or considerable remissions are not to be so soon expected, and that great danger is apprehended from repeated exacerbations.

"4. In the case of genuine intermittents, while a due quantity of bark is to be employed, the exhibition of it ought to be brought as near to the time of accession as the condition of the patient's stomach will allow.

"5. In general, in all cases of intermittents, it is not sufficient that the recurrence of paroxysms be stopped for once by the use of the bark; a relapse is commonly to be expected, and should be prevented by the exhibition of the bark, repeated at proper intervals."

When we recollect the difficulties with which the older physicians had to contend in the exhibition of the

* Observations on the Epidemical Diseases in Minorca, from 1744 to 1749. By George Cleghorn, 1779, pages 223 and 225.

† Thomson's Edition, vol. i. p. 673.

crude bark, we cannot sufficiently applaud the ingenuity with which they endeavoured to overcome them, and the constancy with which they adhered to those sound principles of therapeutics which their means enabled them so inadequately to apply. The great advantage which the modern physician enjoys, is simply this, that he is able by means of quinine to carry out those same principles more easily, thoroughly, and safely.

The use of quinine in the treatment of malarious fevers has during the last twenty years been gradually gaining ground in India, and may be said to be now universally adopted. Dr. Macpherson of Calcutta *, in an historical notice of this subject, alludes to the writings of the following authors as confirmatory of this statement. Dr. Geddes, in 1828; Mr. Corbyn, in 1833; Dr. Wright, in 1834; Mr. Eyre, and Mr. Twining, in 1835; Dr. H. H. Goodeve, in 1837; Mr. Green and Dr. J. Murray, in 1840; Mr. Martin, in 1841; Dr. Bell, in Persia, in 1842; myself and Dr. Macgregor, in 1843; also Dr. Williams, Dr. Macrae, Dr. Ford, and Mr. Hare. For further confirmation I would refer to the Transactions of the Medical and Physical Society of Bombay. In these volumes the subject of malarious fever is very frequently considered, and the efficacy of quinine very generally acknowledged.

Dr. Geddes has been named by Dr. Macpherson as among the earliest of the Madras medical officers who were instrumental in bringing about the use of quinine in India. In the later work published in 1846, by

* On Bengal Dysentery and its Statistics; with a notice of the use of large Enemata in that Disease and of Quinine in Remittent Fever. By John Macpherson, M. D., Assistant, Presidency General Hospital, Calcutta, 1850.

this able and accurate observer *, there are valuable clinical observations on the use of quinine in fever, well worthy of attentive consideration. They are too long for insertion here, but I cannot deny myself the satisfaction of quoting that part of Dr. Geddes' remarks which relates to the use of quinine in complicated cases.

"The exhibition of quinine," he writes †, "can go on along with that of any remedy for attendant symptoms; and, inasmuch as the latter may depend upon or be aggravated by the febrile accession, this medicine must be considered as an auxiliary to any remedial means, even of a supposed discordant nature, which may be employed for the relief of such symptoms. Thus quinine has been combined with the treatment suitable to inflammatory, dysenteric, and other affections; and by preventing the increased febrile action of the paroxysmal disease, it has tended, in a material degree, to the diminution and ultimate removal of all the accompanying morbid phenomena."

Dr. Haspel ‡, in his work on the Diseases of Algeria lately published, inculcates the same principles in respect to the use of quinine in complicated cases of remittent fever.

Within the last two or three years, the exhibition of quinine in scruple or half-drachm doses, instead of smaller ones more frequently repeated—first followed by French and American physicians—has been advocated in the treatment of Indian intermittents by Drs. Corbyn §, Mackinnon, Mactier, and C. Murchison. ||

The observations of Drs. Mackinnon and Mactier were made on European artillerymen in the Punjaub;

* Clinical Illustrations of the Diseases of India. By William Geddes, M.D., p. 175.

† P. 176.

‡ *Maladies de L'Algerie*. Vol. ii. pp. 176. and 184.

§ The Indian Annals of Medical science, No. i. p. 140.

|| Edinburgh Medical and Surgical Journal for April 1855.

and half-drachm doses were used. Those of Dr. C. Murchison were made, apparently with great care and intelligence, on the 2nd Bengal European Regiment in Burmah; and scruple doses were given.

The conclusion of all these observers is, that one of these doses is generally sufficient to prevent a recurrence of the paroxysm, whether the type be quotidian or tertian, and that the most advantageous time for its exhibition is in the course of the sweating stage. All agree in stating that these large doses are never followed by unpleasant symptoms; that nothing more than some of the ordinary indications of cinchonism has ever been observed. The advantages gained by the single large dose of quinine are said to be, 1st, increased efficacy; 2nd, economy; 3rd, less demand on the attention of hospital attendants.

In respect to the alleged invariable safety of the large doses of quinine I have nothing to offer from my own observation either in confirmation or dissent. But I may remark that my clinical experience, as it now stands, would lead me to be cautious in unhesitatingly accepting a result so unlooked for.* There is not anything in these reports which proves to me the greater efficacy of the single large dose given in the sweating stage over the repeated smaller ones given, as recommended by me, towards the end of the intermission. The only data of comparison are those supplied by Dr. Murchison; but in his cases the smaller doses were of two or three grains; a quantity which is undoubtedly too small to be efficacious, and which implies an exhibition of the drug extending over a considerable period of time. The statement

* To assert that large doses of quinine are invariably safe, is to ignore the statements made to the contrary by Pereira and other writers on *Materia Medica*.

that tertians are as efficaciously treated as quotidians by a single large dose of quinine given in the sweating stage, is difficult to explain; for a period of forty hours must often have intervened between the time of the exhibition of the remedy and that of the expected recurrence — implying a persistence of the influence of this agent not in accordance, I apprehend, with general experience.

Dr. Murchison remarks, that in the treatment of intermittents in natives — observed I presume, at the same time with the cases in the Bengal European Regiment — quinine was not required, for chiretta was sufficient to effect the cure. There can be no doubt that, in the treatment of intermittent fever in malarious districts in India, quinine is as necessary for natives as for Europeans; and that, when the disease is readily checked in the former by ordinary bitter infusions, there is only one inference to be drawn, viz., that the malarious influence has been slight.

In the system of treating intermittent fever by a single large dose of quinine given in the sweating stage, there is no provision made for a contingency of frequent occurrence in practice — I mean the case being submitted to our notice for the first time during the intermission. It surely cannot be the intention to recommend delay in adopting the proper means of cure till a paroxysm has been permitted to recur, and to pass through its first and second stages.

In respect to the greater economy of the single large dose, the evidence does not appear to me to be at all conclusive. Dr. Murchison has entered fully into this question, and, on the authority of Dr. Christison, resting on data obtained from India in 1831, he assumes that thirty-six grains of quinine is the quantity usually

required to check a paroxysm when repeated small doses are used. But it is sufficient objection to urge against this estimate, that data respecting quinine framed in India in the year 1831, when the medicine was only coming into use, can be of little account in the year 1855.

The third reputed advantage I allude to with some hesitation. When troops are actively employed unlooked-for exigencies may arise, and call for the exercise of judgment in the economy of our means. Under these circumstances routine systems of treatment which make fewer demands on the attention of hospital subordinates are a practical gain. But, apart from these circumstances, they do not conduce to the comfort and welfare of the sick, or the character and usefulness of practical medicine.

I have ventured to make these remarks, not in opposition to this system of exhibiting quinine,—for it is advocated by observers whose opinions I respect,—but rather with the view of showing that the question is still an open one, and only to be decided by further careful clinical inquiry.

The exhibition of large doses of quinine in the early stages of the remission of remittent fever is recommended by the same authors. Dr. Murchison proposes ten-grain doses; but his experience of its efficacy has been small. I am disposed to attach more value to this suggestion than to those relating to intermittent fever.

In the year 1851 the treatment of Bengal remittent fever with scruple doses of quinine repeated several times during the height of the exacerbation, was advocated by Mr. Hare of the Bengal Medical Service. The subject attracted considerable attention at the

time, and was much discussed. I have no intention of reviving the discussion or of reviewing the arguments. The plan of treatment is opposed to the principles which I have endeavoured to explain and inculcate. There is one remark, however, which forces itself upon me; it is, that the tendency of the system is to favour superficial clinical observation; and this of itself is a very serious defect. That such is the tendency of the system is evident in the following extract from Mr. Hare's Report* :—

“I thus treated 421 cases in all of Bengal fever, and during the experiment some remarkable facts were observed. My orders to my apothecary in both wards were to give scruple doses of quinine to every patient with symptoms of fever, from the very first moment of admission, and they often thus got forty grains of quinine before I saw them. During part of the year, viz., March, April and May, small-pox and measles raged like an epidemic in Calcutta. Numbers of these patients in their early stages, before the appearance of any eruption, were sent to my ward as fever cases, and were treated as the rest with large doses of quinine, sometimes for thirty-six hours before I could detect their disease. Almost all these cases terminated fatally. Latterly, however, I was able to avoid these errors, by watching the effect of the first dose of quinine. For in cases not malarious, it invariably caused great uneasiness, without any benefit to the general symptoms. Moreover deafness and singing in the ears were very quickly induced; whereas in malarious fever with the same ardent symptoms, the quantity of quinine taken without producing any cinchonism was often extraordinary, and so far from uneasiness, it seemed always to give relief, and the febrile symptoms yielded rapidly under its use.”

There is still another view to take of the use of large doses of quinine. In those forms of malarious fever in which the influence of the morbid cause is intense, and congestive phenomena are present, it may be well to give large doses of quinine, because in these states it is

* The Indian Annals of Medical Science, No. ii. p. 474.

probable that we may expect only a very partial absorption and assimilation of the medicine.*

I would, in conclusion, remark, that the opinions arrived at by me in regard to the use of quinine rest on personal, clinical observation, and have been formed independent of the analogous ones of other observers. They were expressed in the form in which they are now stated in the pages of this chapter which precede the present section, before the authorities just quoted were specially referred to. I have made this statement, and a similar one relative to my opinions on the mercurial treatment of fever, simply that the authority of my own observations may be added to that of others who,

* *Warburg's Fever Drops* have at times acquired a reputation in parts of India. In 1844, when attached to the European General Hospital, eleven bottles were tried by me. In one or two of the cases there was a decided sudorific action from the medicine, and the febrile paroxysm seemed to be shortened, and did not recur for several days; but in none was a cure effected. In other cases there was no sudorific action from the medicine and the fever was in no respect benefited by its use. In one case the fever was checked for a time, but marked subacute inflammation of the stomach was excited. From these trials I drew the conclusion that Warburg's drops were an addition of very little value to the means which we already possess of controlling the fevers of India; and that in some cases their use is not unattended with risk of injury.

In 1851 I was asked to see an English merchant in Bombay, who in the month of July, from residence in a swampy locality, became affected with remittent fever complicated with diarrhœa. He was moved to a better situation. The state of the bowels interfered, it was said, with the use of quinine. I saw this gentleman on the eleventh day of the fever, the third after it had become continued, and one after a bottle of Warburg's drops had been given. It caused profuse sweating, which continued at the time of my visit; the adynamic symptoms were well marked. He died twenty-four hours afterwards. Here the profuse diaphoresis from the medicine must have increased the exhaustion.

through the same process, have been led to similar and independent conclusions.

On the Prophylactic Use of Quinine.—The question of the prevention of intermittent and remittent fever in those exposed to malarious influence by the daily use of a small quantity of quinine is very important. So far as I am aware, evidence on this point is as yet neither extensive nor conclusive. But the expectation of a prophylactic influence from quinine is very reasonable in theory, and the subject is well worthy of attention. I have no opinions grounded on personal experience to offer.

Since the preceding remarks on quinine were written I have had the advantage of perusing the interesting lectures on *Materia Medica* delivered by Dr. Bence Jones at the Royal College of Physicians in the early part of 1855.* In one of these lectures the observations and experiments of M. Briquet in his work, "*Traité Therapeutique de Quinquina et de ses Preparations*," are particularly referred to. As I have been unable to obtain the original work, I shall avail myself of the statements made by Dr. B. Jones.

M. Briquet concludes, from clinical observation and experiments on animals, that the action of fifteen grains of quinine and upwards given daily, is to lessen the frequency of the pulse, and that the diminution in the number of the pulsations is proportioned to the quantity of quinine taken, and also to the previous frequency of the pulse before commencing the medicine. He is further of opinion that the quantity of the fibrin of the blood is increased, and that of the blood-globules diminished, the water increased, and the albumen unchanged by quinine. The presence of quinine may be detected in the urine

* Medical Times and Gazette. May and June 1855.

in an hour or two after it has been taken by a solution of iodine in hydriodate of potassa. Dr. Jones states, in the following terms* the results of M. Briquet's experiments and observations.

"The general conclusions which M. Briquet forms regarding the action of quinine on the circulation are, —

"1st. That the maximum diminution of the pulse is rarely twenty to twenty-five pulsations a minute, even in typhoid fever.

"2ndly. That the diminution is always in direct relation to the previous frequency of the pulse.

"3rdly. That the reduction is never below forty beats a minute.

"4thly. That much fibrin in the blood, or acute inflammation prevents the depression.

"5thly. That large doses of quinine produce so serious a perturbation of the economy, that they should not be given unless the illness, as regards length, seriousness, and accidents, is sufficiently important."

Again :

"The physiological and pathological action of quinine in its passage through the system is given by M. Briquet to the following effect: — In from two and a half to four and a half grain doses, it stimulates the circulation, respiration, and nutrition. It may, in such doses, be said to elevate the principal vital actions. In doses of nine grains and upwards, this effect is completely changed. In a few hours it produces general debility of the nervous system. For the first hour or two, there is excitement of the brain; congestion of the veins of the pia mater; a feeling of tension and pulsation in the head; sensitiveness to light; beating of the ears, vertigo, tremor of the limbs, palpitation of the heart; internal agitation and general excitement; heat of the skin, frequency of the pulse, and perspiration. After a single very large dose, these symptoms acquire great intensity. Then the most intense agitation, delirium, and even convulsions, are caused by diminution of the nervous power, and cerebral congestion. These symptoms last only for a short period; they are followed by those of the second period, in which there is feebleness and slowness of

* Medical Times and Gazette for June 9th, 1855, p. 565 and 566.

motion, prostration of strength, total loss of voluntary movements, dulness of sight, of hearing, double vision, amaurosis, aphonia from want of muscular action of the larynx; dyspnoea from paralysis of the eighth pair, and then paralysis of the limbs; diminution of the force in the heart and vessels; feebleness of the pulse; more or less sudden stoppage of the heart's action, with loss of heating power. In small doses in health, quinine causes irritation of the mucous membrane of the stomach. In disease, it may cause inflammation of the stomach. On an ulcerated surface, it causes pain, inflammation, ulceration, and gangrene. It may cause irritation of the urinary organs, and pain and inflammation, like the balsams."

Finally:

"The following are the general rules established by M. Briquet, for giving quinine in fever:—

"1st. Give each hour or second hour the sixth or twelfth part of the quantity to be taken daily, and leave ten hours' interval without any quinine.

"2ndly. Gradually increase the dose, until head symptoms, vertigo, and pain, are produced.

"In ague, give the quinine so as to produce the maximum effect at the commencement of the febrile action, so as, if possible, to stop the access.

"In typhoid fever, gave quinine during the night, for the access comes in the afternoon. Quinine, when given in pills, is, in three hours, only one-sixth as active as when given in solution; in five hours, it is four-fifths as active as in solution. Thirty grains in pills do not appear in the urine until six or seven hours after they are taken, while four and a half grains when taken in solution, are detectable in the urine in from three to four hours; fifteen grains, used as an enema, appear in the urine in twelve hours. To produce any effect, the injection must be repeated many times daily.

"Lastly, the absorption of quinine by the sound skin is very doubtful."

I do not feel myself entitled to make any comments on M. Briquet's observations; they are probably to be received rather as suggestions and incitements to further careful inquiry. They at least justify my hesitation in accepting the opinions of those who declare quinine to be innocuous, and they further show that the clinical

physician in India has still before him an ample field for the exercise of accurate research on this question of practice.

Diet. — A statement of the principles which ought to regulate the adjustment of diet in the treatment of remittent fever is easily made. When the indication is to control undue vascular action, then the regimen must be antiphlogistic in all respects. It has, however, been shown that an important part in the management of remittent fever is, to expect, and to be prepared for, the access of prostration. The essential part of the means for preventing and controlling this is the adequate use of farinacea, with milk and animal broths, during the remission.

The usual error made in practice on this point—and a very serious one—is to postpone the use of nutritious food till the signs of prostration are urgently present. The judicious physician, however, foresees their advent, appreciates their earliest approach, and seeks to prevent their increase, by the timely and skilful use of means of support. This is a part of the management of remittent fever in India, which calls for great watchfulness and intelligence in the practitioner. It is one on which success in bad cases very often mainly depends.

On Change of Air. — The importance of placing fever patients, whenever practicable, in a pure and temperate atmosphere cannot be overrated. It favours pulmonary elimination; and this, in the management of zymotic diseases, must always be a leading indication. I have frequently been struck with the great disadvantages under which the graduates of our Indian colleges are required to treat cases of fever in private practice. The inattention to sanitary principles exhibited in the construction and arrangements of the houses, even of

the better classes of the native community, is to them a serious evil, which, I doubt not, their intelligence will, before long, acknowledge and remove.

It must always, then, be a rule of practice to place a fever patient in the most advantageous circumstances that we can command as respects house and apartment. If the situation be undoubtedly malarious, and that in which the fever has been acquired, then the removal of the patient to a more suitable adjoining locality, where medical treatment and care are also available, is a very necessary measure. But in fact this contingency does not frequently occur in India. Hospital patients, before they come under our care, have already experienced the benefit of change from the locality in which the disease was acquired. In the instance of European officers and others, it will very often be found that the fever has not been caused by malaria generated in the neighbourhood of their residences; but that there has been exposure to its influence on the occasion of a hunting, shooting, or pic-nic expedition.

Assuming that the advantages of a well-ventilated apartment have been secured, and that there is no reason to suspect much malaria-generation immediately around, the question arises, whether it is an indication, during the persistence of the febrile disturbance,—with a view to its removal—to recommend change of air?

If it be true that quietude, frequent observation of the symptoms, and variation of the treatment, are conditions essential to the successful management of bad cases of remittent fever, then it must be very evident that the abstraction, by change of air, of all these conditions, must be a serious detriment to the patient. Yet there can be no doubt that this has been very frequently done, apparently from a want of discrimination

of the circumstances which may render the removal of fever patients to a short distance necessary; but which can never justify the excitement and fatigue of travelling, and the withdrawal of medical care and treatment.

That this evil has existed is very evident from the following facts:—

A medical officer, on the 10th of October, 1829, was taken ill with fever at Jumbooseer in Guzerat. The attack was treated with depletion and mercurials, and was characterized by tendency to exhaustion. He went to Tankariabunder and embarked there for Bombay on the 19th. Suffered in the boat from nightly exacerbations, and sense of exhaustion in the day. He reached Bombay on the morning of the 23rd with a thready pulse, and died at 9 P.M.

A military officer was taken ill with remittent fever at Rajcote on the 18th October 1834; treated with mercurials and purgatives, and sent on the 22nd to the Coast and Bombay; supplied with fever pills and purgatives. He died on the road on the 26th.

An officer at Ahmudnuggur in Guzerat, after ailing for two or three days, became affected with remittent fever on the 13th August, 1835. There were noon and midnight exacerbations and morning remissions. He was bled, used calomel and purgatives, and was sent to Hursole on the 18th. He reached it exhausted on the 19th, and died on the 20th. He was on his way to the sea coast.

A military officer, in the month of October, 1839, was ill for a week with fever at Ahmedabad. He was sent to Cambay; was exhausted, there was wandering delirium, oppression of breathing. Leeches were applied to the head, a blister to the epigastrium, and several free doses of calomel were given. He was then em-

barked for Bombay, and died at sea the night of his departure from Cambay.

The wife of the subject of the last case, also ill with remittent fever, left Cambay at the same time in another boat. I went on board to receive this lady on her arrival at Bombay, and found her suffering from adynamic fever. I attended her for two or three days when she died. It was this case that first fixed my attention on the evils of this routine and injudicious system.

An officer ill with remittent fever at Tatta in Scinde, in December, 1840, was sent to Kurrachee, and was seen there three days afterwards in a state of febrile excitement with delirium and fulness of both hypochondria. He was bled and purgatives were given, also a draught with half a drachm of solution of muriate of morphia. He became comatose, and died twelve hours after his arrival. The head was not examined. The liver and spleen were enlarged, congested, and friable.

An officer of intemperate habits, and often injudiciously exposing himself to the sun, suffered from two or three attacks of fever at Tatta in December, 1840. These were followed by dysentery. He proceeded to Kurrachee, and arrived there in an adynamic state, and died the following day. The liver was much enlarged, and there was softening of the gastrointestinal mucous lining.

A gentleman had fever at Poona on the 21st of November, and was first seen on the 23rd. The morning remission and noon exacerbation were marked on the 24th, 25th, 26th, 27th, 28th, and 29th. He was treated with leeching, mercurials, purgatives; and general blood-letting on the 28th. No quinine. He was sent from Poona on the morning of the 29th, and was seen at

Bombay on the evening of the 30th. There was exacerbation with stupor and asthenia. On the morning of the 1st a remission; at noon an exacerbation with increasing stupor. He died comatose at 10 A.M. of the 2nd.

These cases will suffice.* They show unmistakeably the injurious effects of the excitement and fatigue of travelling, and the neglect of medical treatment. It is not difficult to understand how this system of mismanagement obtained currency. It is very evident that depletory measures and mercury are quite unequal to the cure of remittent fever. In this difficulty medical men and the public clung to the hope of benefit from change of air, and have been slow to interpret rightly the casualties which have resulted from it.

When treating of splenic cachexia, I pointed out the necessity of change of air with the view of improving the state of the constitution. When health has been injured by remittent fever, and convalescence is in progress, then change of air becomes, on the same grounds, a very useful and important measure.

* To satisfy myself on the question of change of air in remittent fever, was a principal object with me in examining the cases of sick officers. From the ninety fatal cases of which I have notes, I have selected the eight just quoted. On the other hand, of 1388 successful cases of officers recommended for change of air on different accounts, I do not find that I have noted a single instance of benefit from the measure adopted under those circumstances of fever to which my remarks have been directed.

SECTION VI.

ON CERTAIN OBSCURER PHENOMENA PROBABLY RELATED TO MALARIA.—AND ON ADYNAMIC REMITTENT FEVER INFECTIOUS IN CHARACTER OBSERVED AT PALI AND ELSEWHERE.

On certain obscurer Phenomena probably related to Malaria.—The phenomena of intermittent and remittent fever have been attributed to malaria as a cause, and their presence may be received as evidence that this agency is acting on the system.

The observations made on the symptoms of the cold stage of intermittent fever, and on the diagnosis between remittent and symptomatic fever, have evinced my belief that the influence of malaria may be indicated by phenomena less marked, but still partaking somewhat of the character of those of intermittent and remittent fever. This subject may be pursued still further, and with much advantage to the practitioner in malarious countries. A close observation in tropical climates will, I believe, lead to the conclusion, that there is a tendency generally in all forms of disease to put on more or less of a periodic character in the malarious months of the year. This feature in India is more likely to be observed in natives and in the long resident European than in the recently arrived. It is practically important; for, when observed, it may be held as suggesting caution in the use of antiphlogistic means, as well as the question of the expediency of giving quinine. After a period of residence in tropical countries, occurring sooner in some localities and constitutions than in others, there is an influence exercised on the system, whether from general climatic conditions, or the more special agent malaria, may perhaps be questioned. It is, however,

more in accordance with our present knowledge to attribute it to the latter agency.

There are many phenomena which may be taken as indicating the presence of this influence,—as restless nights, pain of limbs, frequent yawning, depression of spirits, giddiness, booming sounds in the ears, a sense of faintness or chilliness with vomiting, defective secretion of the liver leading to pale alvine discharges without jaundice; defective irritability of muscular fibre leading to a feeble, sometimes intermitting pulse, to constipation and dyspeptic symptoms. In these phenomena, if watched, a marked periodic tendency may often be observed. They are more apt to occur at periods of considerable atmospheric changes, and very frequently about full or new moon.* All these symptoms are very distinctly controlled by the use of

* The question of lunar influence on disease in India has been much discussed at different times. In the second and sixth numbers of the Transactions of the Medical and Physical Society of Bombay, the reader will find the latest consideration of this subject with which I am acquainted. The first paper, by Mr. Murray, details what the author conceived to be illustrations of lunar agency in chronic disease. The second is by Mr. Peet, and embraces an inquiry into the evidence on which the opinion rests.

On this question I shall merely observe : 1. To find on the same day several of the asthenic inmates of his wards affected with febrile disease, though all had been free of it for many days previously, is a fact familiar to the Hospital physician in India. The days on which this is observed are often coincident with new or full moon.

2nd. To find those who have suffered from malarious fever experiencing recurrences at the periods of new and full moon, is a fact familiar both to patients and to medical men in India.

3rd. When this coincidence of febrile disease and these lunar phases is noted, there will, I believe, generally be found to be present an appreciable atmospheric change of temperature, of moisture, of direction of the winds, &c. It is this atmospheric vicissitude, I apprehend, which is the determining cause of the febrile disturbance.

quinine. The occurrence of night paroxysms of malarious fever is a familiar fact. These phenomena of the lesser influence of malaria may occur at the same diurnal period. In this way the restless nights may be explained. At all events, there is no doubt that five or six grains of quinine, given at bed-time under these circumstances, more certainly induce to sleep than opium.

The right understanding of these phenomena of deranged health leads to the use of quinine, and, at the same time, to great caution in local blood-lettings, purgatives, and mercury. But the remedial means to which the full development of these phenomena most clearly points, is change to a suitable temperate climate free from malarious influence. This is a most necessary measure; for in the state of constitution of which these phenomena are the evidence, there is unquestionably present a tendency to fatty or other structural degeneration. It need hardly be added that, under such circumstances, the practical indication is very evident. It is, by the exercise of foresight on our part, to prevent degeneration from taking place; and there are no means so effectual for this purpose as suitable change of climate. It is to my mind a grievous professional error to wait for the occurrence of structural changes as the signal for recommending change of climate. Pathology has been studied to little purpose if its lessons have not taught us when to anticipate structural lesion; and have not impressed on us the importance and the best means of preventing it.

On Adynamic Remittent Fever infectious in Character. — From 1815 to 1820 a febrile disease* of very

* The terms Pali disease and Mahamurree have been given to this fever. It is much to be desired, I think, that the too common practice

adynamic type prevailed in Kattywar, Kutch, and parts of Guzerat. A similar affection appeared at Pali in Marwar in July, 1836; was more or less present there, and extended to the towns in the adjacent districts up to the middle of 1838. Again, we have notices of this disease in 1849 in Gurhwal, in Kumaon, and, more lately still (1853), in Rohilcund.

The fever was remittent in character, with great tendency to become continued. The adynamic phenomena were well marked. The fever was attended, in the great majority of cases, with glandular swellings of the groins, axillæ, and neck; and, in the cold season, there was in some of the fatal cases dyspnœa, with cough and bloody expectoration. In none were carbuncles and petechiæ or purple patches present.

The number of cases seen by Dr. Forbes* at Pali, from January 29th to February 3rd, 1838, amounted to forty-eight. He thus describes the symptoms†:—

“Of these many had reached from the 10th to the 20th day of the disease, with large buboes, no particular degree of fever, parched skin, tenderness of epigastrium, tongue white and moist, eyes dull and watery, bowels generally very slow, but sometimes loose, and the greater part, with more or less cough; some few complained of little else than the pain of the buboes, with great weakness and loss of appetite. All without exception had buboes, but I met with no instances of carbuncle or vibices.

In the mildest form, the buboes make their appearance with of giving local or native names to diseases in India be altogether abandoned, as tending to lead to careless diagnosis and vague pathology; I allude to such terms as Scinde, Guzerat, Mysore, Bengal, Deccan, Jungle, Pucka fever, Liver, Spleen, Beri-beri, Hill diarrhœa, and many others.

* Transactions, Medical and Physical Society of Bombay, No. ii. p. 14.

† This enterprising officer subsequently lost his life in Central Asia, while travelling on his return from Europe to India.

little constitutional disturbance, attended only by languor, debility, and a general feeling of indisposition; they go on slowly to suppuration, and health is very gradually restored.

“In the most common variety, the invasion is sudden, not being preceded by any feelings of disorder or uneasiness sufficient to engage the notice of the patient, generally takes place in the evening, and is rarely attended with rigors. The occurrence of the febrile symptoms, and the pain and swelling of the glands, appear to be in most cases simultaneous; in many the buboes showed themselves before the fever, while in none were they developed at a later period than the second day of the disease. The symptoms most generally present are great prostration of strength, giddiness, headache confined to the forehead, excessive thirst, dry burning skin, tongue moist and white, pulse from 110 to 130, small and weak, slight vomiting and tenderness of epigastrium, bowels confined, urine scanty and high coloured, great indifference as to recovery, and disinclination to speak or answer questions. The fever is of the remittent type, with marked tertian exacerbations, often attended with low delirium, but the crises are very imperfect. If uncomplicated with any thoracic or abdominal affection, and if the patient survives the fifth day, it commonly abates in violence after the seventh or eighth, so that in the third week little else remains but extreme debility, and sympathetic evening flushes from the buboes, which by this time have advanced to suppuration. In most of these cases, however, more or less cough is present through the height of the disease; it is generally dry, but sometimes accompanied by white frothy expectoration.

In the more violent and malignant forms, the attack sets in suddenly, with severe headache, staggering and giddiness, quickly followed by delirium. The morning remission is scarcely perceptible, except by the abatement of the delirium. No glandular swellings appear, or they remain small, hard, and exquisitely painful; vomiting of bilious matter, and latterly of dark coffee-coloured fluid, comes on, the bowels are either constipated, or the stools black and fetid, the teeth are covered with sordes, and the patient tosses and moans in bed. A dry cough now supervenes, attended with severe pain in the region of the heart, and laboured respiration; partial insensibility passes into profound coma with trismus, and death takes place early in the morning of the fourth day, or, in cases where the symptoms are less violent, on the morning of the sixth.

The most fatal modification of the disease, from which no recovery has been known, sets in without any febrile excitement

whatever, if we except a very slight acceleration of the pulse. The most prominent symptoms from the commencement are slight cough, and expectoration of blood; the cough appears to an observer more like a voluntary act to relieve oppression or constriction about the chest, than to be caused by pain or irritation. The body is covered with frequent clammy sweats; the countenance exceedingly anxious and wild; thirst urgent; tongue clean; bowels slow; the urine increased in quantity, and loaded with blood, which also oozes from the gums. The expectoration of blood becomes more copious. To the anxiety and oppression of the chest, is added pain in the cardiac region, the pulse becomes quick and thready; the action of the heart tumultuous; faintness and complete exhaustion come on; and a fatal syncope puts an end to the sufferings of the patient, generally within forty hours from the attack; the intellectual faculties remaining perfect till nearly the last moment.

It is, however, by no means rare to see the different forms mixed or merging in each other. The attack may be at first mild, and apparently without much danger, the buboes well developed and the fever slight; when from the third to the fifth day, and sometimes so late as the seventh, the occurrence either of delirium, coma, bloody expectoration, diarrhœa, retention of urine, or recession of the bubo, point out an unfavourable change, and the fatal termination soon follows, as in the more aggravated forms.

Dr. Forbes alludes to the treatment, and points out the inapplicability of all depressant means. He then makes the following observation:—

“The most fatal variety, where the discharges of blood take place, and the vital cohesion of both solids and fluids seem to be diminished, resembles so closely some cases of snake-bite which I have seen at Balmír, that I trust no apology will be necessary for relating two of them here. This resemblance is no less curious than interesting, but as it would be out of place to enter on any consideration of it here, I shall only premise, that although passive hæmorrhage after snake-bite may appear a new or uncommon symptom to many, as it did to myself, cases of this description are of constant occurrence in the south-western part of Márwár and towards Scinde, whenever the patient survives the receipt of the injury for some hours. The snake alluded to is from two feet to two feet and a half in length, of a dirty yellowish brown colour on the back, with a white belly, and without spots.

Similar effects have been witnessed by me from snake-bite on the Mahabuleshwur Hills. This subject will be alluded to particularly in another part of this work.

The fever of which I now write has been observed in all seasons of the year. It has prevailed amongst the poor, for the most part in filthy, badly-ventilated houses and villages, and been preceded by seasons of famine. The mortality which has attended it has been very great. Dr. Forbes thinks four-fifths of those attacked have died. In the circumstances just stated we have abundant explanation of the etiology of the disease. The predisposing and exciting causes of adynamic fever are sufficiently distinct. But the question of the contagious character of the fever, and of its identity or not with the plague of Egypt and the Levant, have been much discussed. There arose in consequence speculations relative to the manner of its introduction into India in the course of commerce from the Red Sea or Persian Gulf; and quarantine measures have been on occasions strictly enforced.

It would be unprofitable to add my own opinions and speculations to those which already exist on a subject of which I have no personal knowledge; but I may state my impressions to be in favour of the belief of its being a fever of endemic origin, assuming infectious properties from filth, crowding and imperfect ventilation, and having features in common with the plague of Egypt,—as is more or less the case in every fever in which adynamic symptoms and blood disease are well marked.*

* The first known reports of this disease are by Messrs. McAdam, Whyte, and Gilder, published in the First Number of the Transactions of the Medical and Physical Society of Bombay.

The disease as appearing at Pali and the adjoining districts has

That malarious fevers are liable, under circumstances favourable to the spread of infection, to become infectious, is an old opinion. Fordyce held these views, and Clark and Lind believed that the Bengal remittent fever was at times infectious.

been described by Messrs. McLean, Irvine, Keir, and Russel, of the Bengal Medical Service, and the results of their observations have been brought forward in an able memoir by Dr. James Ranken, at the time secretary to the Medical Board of Bengal. It was also reported on by Mr. Cramond and Dr. Forbes of the Bombay Medical Service. The latter gentleman published a very interesting report of his observations in the Second Number of the Transactions of the Bombay Society already referred to in the text.

The accounts of the disease in Kumaon and Rohilcund are given by Drs. Pearson, Francis, Renny, and Stiven of the Bengal Service, and are noticed in the Second and third Numbers of the Indian Annals of Medical Science.

The subject is also ably discussed by Dr. Mackinnon, in his treatise on the Prevailing Diseases of Bengal and the North-west Provinces, published in the same Journal.

In the Fourth Number of the Indian Annals of Medical Science, received since these remarks were written, I find a report by Dr. Farquhar and Mr. Wallick, of an adynamic remittent fever which prevailed in the valley of Peshawur in 1852 and 1853, and was believed to be contagious. The worst cases were complicated with jaundice, and a relapsing tendency would seem to have been well marked in the disease.

CHAPTER III.

ON COMMON AND ARDENT CONTINUED FEVER. — THE
FEVERS OF CHILDREN IN INDIA. — STATISTICS OF FEVER
IN THE EUROPEAN GENERAL HOSPITAL AND JAMSETJEE
JEJEEBHOY HOSPITAL AT BOMBAY.

SECTION I.

FEBRICULA AND ARDENT CONTINUED FEVER. — CAUSES. — SYMPTOMS.
— TREATMENT.

FEVERS, intermittent and remittent, caused by a specific morbid agent—malaria—have been treated of. In the colder European climates we have continued forms of fever—typhus, typhoid, and relapsing fever,—depending, it is believed, on three distinct specific morbid causes. In these climates, idiopathic fever may also be produced by ordinary exciting causes. To this form the name Febricula is now generally given.

In tropical countries, in addition to intermittent and remittent fevers, there likewise occur forms of idiopathic fever produced by ordinary exciting causes,—as vicissitudes of temperature, great heat, violent exercise, excitement of mind, excesses in eating, intemperate habits, and imperfect excretion. To fevers thus induced the names ephemeral, common continued, and ardent fever have been given. These we have now to consider.

They are most common in those parts of India which do not experience much of the influence of the monsoon rains, and whose hot season is not tempered

by regular breezes from the sea. They are more common in the central parts of the table land of the Deccan and Mysore, the Ceded districts, the coast of Coromandel, Scinde, and the Punjaub, than in Bengal or Bombay, and the western coast-line south of Surat. They are most frequent in the months of March, April, and May; but they also prevail in June and July in localities where the temperature is elevated, but malaria-generating conditions are absent.

The mild form to which the name *ephemeral* has been given may proceed from any of the ordinary exciting causes which have been mentioned, and may occur in natives as well as in Europeans who have been some time resident in India. It consists of febrile symptoms without local complication, commencing with chills, followed by reaction, and this by perspiration, and thus is removed in twenty-four or thirty-six hours. But the febrile reaction may continue for periods of four or five days; when so, it becomes a *common continued fever*. For the treatment of *ephemeral* and *common continued fever* we use such means as an emetic, purgatives, tepid sponging, diaphoretics. Perhaps in plethoric individuals, when there is much headache and flushing of the face, a moderate general blood-letting, or leeches to the temples, may be an expedient measure. These, then, are not serious affections, and do not differ from the *febricula* of the colder climates.

But the *ardent continued fever* is almost confined to tropical countries, and is a very serious disease. The exciting causes are elevated temperature, exposure to the sun, excessive exercise, mental excitement, excesses in eating, intemperance, defective excretion. There may be several of these causes combined; but in order

to produce the disease in its most aggravated form elevated temperature is a necessary condition. Another necessary condition is, that there should be present that kind of predisposition peculiar to the robust European ; and in order to the formation of the disease in its most aggravated form, there should be that kind of predisposition peculiar to the robust European lately arrived in a warm climate. This form of fever, then, is almost confined to the hot and dry months of the year, and to regiments or recruits recently arrived from Europe.

Symptoms. — The attack is generally sudden, often without much chilliness. The face becomes flushed ; there is giddiness and much headache, intolerance of light and of sound. The heat of skin is great ; the pulse frequent, full, and firm. There is pain of limbs and of loins. The respiration is anxious. There is a sense of oppression at the epigastrium, with nausea and frequently vomiting of bilious matters. The bowels are sometimes confined ; at others vitiated bilious discharges take place. The tongue is white, often with florid edges. The urine is scanty and high-coloured. If the excitement continues unabated, the headache increases, and is often accompanied with delirium. If symptoms such as these persist for from forty-eight to sixty hours, then the febrile phenomena may subside, the skin may become cold, and there will be risk of death from exhaustion and sudden collapse. In some cases the cerebral disturbance is greater in degree ; and in these death may take place at an earlier period in the way of coma ; or the symptoms of gastritis may be very prominent, and death from exhaustion may occur early ; or jaundice may appear and aggravate the disease.

The continuance for two or three days of excessive

vascular action such as that now described, must necessarily be followed by a corresponding depression. In this we have the explanation of the collapse and exhaustion, which become developed as the febrile excitement subsides. Again, the excessive action, with the addition of retained excretions, must vitiate the blood; and in some cases there is evidence of this in the dark grumous matters vomited and evacuated from the bowels. When these phenomena are present, those of exhaustion and collapse become very prominent, and no doubt are in a great measure to be attributed to the influence of the deteriorated blood.

The question of diagnosis between this form of fever and inflammatory remittent fever has been already considered (p. 94.), and the remarks then made should now be referred to.

Pathology.—In the excessive vascular action of this form of fever there is risk to important organs, as in the stage of exacerbation of the severer remittents. There is also danger from prostration after a time in consequence of continuance of high febrile excitement.

But between the pathology of ardent and remittent fever there is believed to be this great difference. In the former there is no materies in the blood, as in the latter, exercising a sedative influence on vital actions, and requiring time for its elimination. Therefore, we may hope that by controlling the vascular excitement at the outset of ardent fever we are adopting the most efficient means for shortening the duration of the disease.

There is then much more scope in the treatment of ardent fever for the use of free and repeated general and local bloodletting, cold affusion, tartar emetic, and mercurial and other purgatives. It must, however, be

borne in mind, that these means are only effective when used promptly in the early periods of the fever, and that, if they be delayed till the third or fourth day,—when in the course of the disease the phenomena of prostration may be looked for,—their effect must be to hurry on the fatal result. They must be adopted also in recollection of the difficulties which sometimes beset the diagnosis of this from the remittent form of fever, and of the greater caution required in their use in the latter disease.

The symptoms of ardent fever, and the success of prompt and active treatment, are well illustrated in Dr. Arnott's Medical History of the Bombay Fusiliers in the Punjaub.* The fever prevailed chiefly in the months of June, July, and August at Peshawur; when the men were in tents under a temperature ranging from 70° to 114°, described by the author as intense, and with hot blasts and thick suffocating clouds of dust, and as fearfully oppressive, day and night, and completely breaking and disturbing rest. In these months 884 admissions from fever took place, and not a single death.

Dr. Arnott thus describes the character of the fever and the nature of the treatment which he followed:—

“The character of the epidemic fever which prevailed in July and August, may be inferred, when I mention that out of the 798 cases admitted in these two months not a man died. The symptoms on admission, it is true, were often very urgent, and demanded the most prompt and decided measures for their relief. There was pungent heat of skin; great thirst; parched, red, and dry tongue; quick, full, and strong pulse; racking pains in different parts of the body, and acute headache, with flushed countenance; throbbing of the temples, restlessness, nausea, and vomiting of bilious matter, &c.; which symptoms,

* Transactions of the Medical and Physical Society of Bombay, 1st Series. 10th Number, p. 34.

no doubt, were in many instances aggravated by the indifferent shelter the men had from the inclemency of the weather in that hot valley. The autumnal fever, which afterwards appeared, was almost equally mild, as we lost only three men from fever in October, November, and December.*

“To describe the plan of treatment of a disease having such marked symptoms seems almost superfluous. Evacuants fully and freely employed, with copious and repeated venesection, cupping and leeches (in fact, I never at any former time had occasion to prescribe bleeding, either to the same extent or so frequently), aided by tartar emetic, till all local determination and the chief urgent symptoms were removed, and afterwards quinine, were the means had recourse to.”

SECTION II.

THE FEBRILE AFFECTIONS OF CHILDREN IN INDIA.—FEBRICULA.—
INTERMITTENT AND REMITTENT FEVER.

THE febrile affections of children in India are best understood by keeping in view the principles which have been stated in respect to adults.

During the period of infancy—from birth to the end of the second year—attacks of febricula occur from errors in diet or the irritation of teething, just as in the colder climates, and they require the application of the same general principles of treatment. It is also necessary in the management of these febrile symptoms in early life, in India as elsewhere, to be very careful in our diagnosis, and not to mistake the fever symptomatic of an internal inflammation for simple febricula. This caution is very necessary in respect to native children in the cold season in Bombay, for I have seen several cases in which pneumonia had been overlooked.

* In these three months the range of the thermometer was from 42 to 91.

Malarious fevers, intermittent or remittent, are, according to my observations, not common in the period of infancy. They no doubt occur, and probably much more frequently in very malarious districts than I have myself witnessed. The most striking instance that I have seen was early in November 1837. On the Bhore Ghaut, midway between Campooly and Khandalla, on the route from Bombay to Poona, there is a small house situated on the margin of a ravine in that pass for the accommodation of the gatherer of the tax levied on carts and bullocks passing over the mountain. At the time adverted to it was occupied by an old European pensioner and his wife. They had both suffered from intermittent fever. In the woman the indications of malarious fever were well marked in her sallow countenance and emaciated frame, and at the time I saw her she suffered from tertian fever. She had a child six weeks old, which she was nursing, and it also experienced regular febrile paroxysms commencing with a well marked cold stage. I saw the child in the cold stage of one of the attacks.

During the period of childhood, from the third year to the tenth year and upwards, we also meet with febricula as in colder climates, proceeding from the same ordinary causes, and exhibiting that feature of remittance characteristic more or less of all the febrile affections of early life.

These should be treated on the same principles as in other countries.

But in India, during the period of childhood, just as in the adult, malarious fevers are by far the most frequent idiopathic febrile affections. I have before me the diaries of many cases of intermittent and remittent fever treated by me in the Byculla schools while I held

medical charge of that institution. In the character of the symptoms they resemble the same affections in the adult, and call for the same means of treatment modified to difference of age and peculiarities of constitution.

Quinine may be used with the same freedom in the malarious fevers of childhood as in those of the adult, and it constitutes as essential a part of the treatment. There has, I think, been hesitation on this point in the minds of many, but I can state, on the authority of my own experience, and that of friends in whose judgment I place confidence, that two or three grain doses may be given with freedom in necessary cases in a child of three years of age. An European child of about seven years of age, ill for several days with intermittent fever, uninfluenced by a grain and a half doses of quinine, was brought to me. The recurrences were at once prevented by five or six grain doses.

The zymotic fevers of children in the colder climates are, as the analogous affections in the adult, unknown in India.

SECTION III.

STATISTICS OF FEVER IN THE EUROPEAN GENERAL HOSPITAL, AND
IN THE JAMSETJEE JEJEEBHOO HOSPITAL AT BOMBAY.

TABLES V., VI., VII. represent the total* admissions of fever (4037) into the European General Hospital at

* They are chiefly intermittent and remittent. The proportion of ephemeral fevers is very small; it is only given for the first quinquennial period, in which they amounted to 8·7 per cent. of the total fever admissions. See Table II.

Bombay for the fifteen years from 1838 to 1853, arranged in quinquennial periods. Table V. is for a period during which I was assistant surgeon in the hospital, and includes cases from which a part of the clinical observations recorded in these pages has been drawn. For Tables VI. and VII. I am indebted to Mr. Stovell, the present surgeon of the hospital.

When we compare the proportion of fever admissions in these three quinquennial periods we find a remarkable difference between the first and the last. In the former (1838 to 1843) the fever to the total admissions were 24·2 per cent. In the latter (1849 to 1853) only 13·5. In the middle period (1844 to 1848) they were 20·6.

In the three Tables the greater proportion of admissions in the six months, from June to November, is well shown—it is 24·1; whereas that from December to May is 14. And if we omit the last quinquennial period—that in which fever admissions were comparatively few—we find that the proportion differs still more widely. That from June to November the fevers are 28·8 per cent. of the total admissions. From December to May they are 15. The month of October, however, is that of greatest prevalence; they amount to 37·5 per cent.

When we regard the mortality from fever in this hospital we find it to be very uniform for these three periods. In the first Table it is 3·5 per cent. of the fever admissions; in the second 3·3; in the third 3·1. From 1838 to 1848 the proportion of fever mortality to total hospital deaths is 12·1; but from 1849 to 1853 it is only 6·7.

TABLE V.—*Tabular Statement of the Admissions and Deaths from Fever of all Kinds in the European General Hospital at Bombay, for the Six Years from July 1838 to July 1843, with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1838.		1839.		1840.		1841.		1842.		1843.		Total.		Monthly Average of the Six Years.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths on Admissions.	Admissions on Total.	Deaths on Total.
January	-	-	11	-	16	2	23	2	22	-	33	3	105	5	4.7	19.1	11.5
February	-	-	7	-	10	-	5	-	10	-	23	1	55	2	3.6	13.3	6.2
March	-	-	5	-	15	1	6	1	22	2	26	-	74	3	4.	14.5	9.
April	-	-	17	1	17	1	8	1	31	1	15	2	88	5	5.6	15.1	12.1
May	-	-	37	1	26	-	19	-	37	1	35	1	154	3	1.9	17.9	3.7
June	-	-	56	-	24	1	48	3	47	1	44	1	219	6	2.7	28.4	11.7
July	-	-	28	-	33	1	67	5	75	-	-	-	179	7	3.1	30.5	18.9
August	-	-	50	-	25	1	47	7	40	-	-	-	179	8	4.4	29.3	22.8
September	-	-	28	3	22	1	35	1	30	3	-	-	141	8	5.6	25.8	15.3
October	-	-	66	1	26	3	143	3	60	1	-	-	318	6	1.8	44.	22.2
November	-	-	48	1	43	2	32	-	58	2	-	-	193	5	2.5	28.1	10.6
December	-	-	16	4	14	-	28	-	28	4	-	-	94	8	8.5	15.3	12.1
Total	102	2	369	11	271	7	461	23	460	15	176	8	1839	66	3.5	24.2	12.1
Per-centage of deaths on annual admissions	1.9		2.9		2.5		4.9		3.2		4.5						
Per-centage of admissions from fever on total hospital admissions	23.8		27.4		20.1		31.3		22.3		18.7						
Per-centage of deaths from fever on total annual hospital deaths	6.9		12.9		6.6		20.7		9.6		16.						

TABLE VI.—*Tabular Statement of the Admissions and Deaths from Fever of all Kinds in the European General Hospital at Bombay, for the Five Years from 1844 to 1848, with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1844.		1845.		1846.		1847.		1848.		Total.		Monthly Average.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions on Total Admissions.	Deaths on Total Deaths.
January -	46	3	15	3	11	-	15	-	18	-	105	6	5.7	17.0
February -	33	2	14	-	7	-	10	1	21	1	85	4	4.7	16.5
March -	21	-	12	-	7	-	9	-	10	-	59	1	1.7	12.2
April -	17	1	19	-	8	-	9	1	14	-	67	2	3.0	13.1
May -	27	-	29	2	21	-	8	1	14	1	99	4	4.0	16.9
June -	29	-	49	2	36	3	23	-	35	-	172	5	2.9	24.1
July -	60	-	53	1	31	2	23	-	29	-	196	4	2.0	28.8
August -	31	-	28	-	48	-	29	3	18	1	154	4	2.6	28.1
September -	28	-	29	-	17	1	18	1	8	-	100	2	2.0	21.8
October -	90	5	55	-	17	1	21	-	5	1	188	8	4.2	31.1
November -	62	1	19	1	26	1	11	1	18	1	136	5	3.7	24.3
December -	16	1	16	1	14	-	5	-	7	-	58	2	3.4	11.1
Total -	460	13	338	11	243	8	181	9	197	6	1419	47	3.3	20.6
Per-centage of deaths on annual admissions -	2.8		3.2		3.3		5.0		3.0					
Per-centage of admissions from fever on total hospital admissions	26.6		24.8		17.5		17.1		15.6					
Per-centage of deaths from fever on total annual hospital deaths	13.5		15.1		10.9		14.1		7.8					

TABLE VII. — *Tabular Statement of the Admissions and Deaths from Fever of all Kinds in the European General Hospital at Bombay, for the Five Years from 1849 to 1853, with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths on Admissions.	Admissions on Total.	Deaths on Total.
January -	9	1	12	3	7	-	9	-	11	-	48	4	8.3	10.6	10.3
February -	7	-	6	1	12	2	5	-	8	-	38	3	7.8	10.3	16.6
March -	8	-	15	-	6	-	6	-	8	-	43	-	-	9.8	-
April -	13	1	3	1	7	-	11	1	11	-	45	3	6.6	8.7	12.0
May -	17	-	12	-	16	-	14	-	32	-	91	-	-	17.5	-
June -	20	1	7	-	15	-	12	-	24	-	78	1	1.3	13.6	3.4
July -	10	2	16	2	9	-	26	-	26	-	87	4	4.6	16.4	12.1
August -	5	-	14	1	12	-	20	1	11	1	62	3	4.8	12.0	7.8
September -	11	-	16	-	8	-	5	-	9	-	49	-	-	13.8	-
October -	10	-	13	-	5	-	11	-	13	-	52	-	-	13.2	-
November -	38	2	14	1	11	-	15	1	15	1	93	5	5.3	17.8	16.6
December -	10	-	13	-	9	-	23	1	38	-	93	1	1.1	15.3	2.5
Total -	158	7	141	9	117	2	157	4	206	2	779	24	3.1	13.5	6.7
Per-centage of deaths on annual admissions -	4.4		6.4		1.7		2.5		0.97						
Per-centage of admissions from fever on total hospital admissions -	13.6		12.8		10.9		13.8		15.6						
Per-centage of deaths from fever on total annual hospital deaths -	8.5		11.4		2.5		6.4		3.6						

EUROPEAN GENERAL HOSPITAL.

INTERMITTENT FEVER.

Tables VIII., IX., X. give the admissions from intermittent fever, from 1838 to 1853, also arranged in three quinquennial periods. They show that the proportion of this type to the total admissions from fever has been 73·6 per cent.

We found from Tables V., VI., VII. that the proportion of fever admissions from June to November was nearly double that of from December to May; but the present Tables show that the excess of the first half year is not due to admissions of the intermittent type, for the proportions of intermittents to total fevers is from June to November 72·3, and from December to May 75·1.

The deaths are 1·1 per cent. of the admissions. It has been stated in the text that we have no data which correctly show the mortality from simple intermittent fever. Much of the mortality stated in these Tables (and I may add in hospital returns generally) is, I am satisfied, not accurately recorded as directly proceeding from intermittent fever. It occurs from inflammations arising in malaria-tainted constitutions, and should be entered under the head of the inflammation, whatever it may be.

Table XI. shows the ephemeral fevers from 1838 to 1843.

TABLE VIII.—*Tabular Statement of the Admissions and Deaths from Intermittent Fever, in the European General Hospital at Bombay, for the Five Years from July, 1838, to June, 1843; with Per-centage of Deaths on Admissions; of Admissions on Total Fever Admissions; of Deaths on Total Fever Deaths for the same Period.*

	1838.		1839.		1840.		1841.		1842.		1843.		Total.		Monthly Average.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions on Total Fever	Deaths on Total Fever
January	-	-	7	-	5	-	17	-	18	-	30	1	77	1	73·3	20·0
February	-	-	4	-	3	-	4	-	10	-	22	1	43	1	78·2	50·0
March	-	-	2	-	8	-	6	1	20	1	23	-	59	2	79·7	66·0
April	-	-	7	-	7	-	7	-	27	-	2	2	60	2	68·2	40·0
May	-	-	24	-	15	-	18	-	32	-	30	1	109	1	64·3	33·3
June	-	-	44	-	27	-	31	1	36	-	43	-	169	1	77·2	16·7
July	-	-	21	-	19	-	13	-	66	-	-	-	113	1	62·1	14·3
August	-	-	33	-	19	-	17	-	33	-	-	-	92	2	63·1	-
September	-	-	13	1	14	-	25	-	27	1	-	-	262	3	65·2	25·0
October	-	-	31	-	17	-	138	2	59	1	-	-	151	3	82·4	50·0
November	-	-	34	-	25	-	32	-	53	-	-	-	73	4	78·2	-
December	-	-	10	1	12	-	26	-	20	3	-	-	73	4	77·7	50·0
Total	62	-	230	2	157	1	334	4	401	6	160	5	1344	18	72·0	27·3
Deaths per cent. of admissions	-	-	0·8	-	0·6	-	1·2	-	1·5	-	3·1	-	-	-	-	-
Admissions per cent. of total fever admissions	60·8	-	62·0	-	57·9	-	72·4	-	87·2	-	90·9	-	-	-	-	-
Deaths per cent. of total fever deaths	-	-	18·2	-	14·3	-	17·4	-	40·0	-	62·5	-	-	-	-	-

TABLE IX.—*Tabular Statement of the Admissions and Deaths from Intermittent Fever, in the European General Hospital at Bombay, for the Five Years from 1844 to 1848; with Per-centage of Deaths on Admissions; of Admissions on Total Admissions from Fever; and of Deaths on Total Deaths from Fever for the same Period.*

	1844.		1845.		1846.		1847.		1848.		Total.		Monthly Average.			
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per cent. of Admissions.	Admissions per cent. of Total Fevers.	Deaths per cent. of Total Deaths.	
January	41	1	12	-	10	-	8	-	16	-	87	1	1.1	82.9	16.6	
February	30	1	12	-	7	-	7	-	13	-	69	1	1.4	81.2	25.0	
March	20	-	12	-	6	-	5	-	8	-	51	-	-	86.5	-	
April	12	-	16	-	7	-	9	-	13	-	57	-	-	85.1	-	
May	26	-	28	-	15	-	6	-	13	-	88	-	-	88.8	-	
June	27	-	40	1	30	1	15	-	32	-	144	1	0.7	83.7	20.0	
July	56	2	51	-	23	-	12	1	21	-	163	3	1.8	83.2	75.0	
August	30	-	24	-	37	-	11	-	14	-	116	-	-	74.0	-	
September	27	-	28	-	10	-	11	-	5	-	81	-	-	81.0	-	
October	84	4	52	-	13	-	15	-	3	-	167	4	2.4	88.8	50.0	
November	61	-	16	-	14	1	9	-	14	1	114	2	1.7	83.8	40.0	
December	14	-	12	-	10	-	4	-	4	-	44	-	-	76.0	-	
Total	428	8	303	-	182	2	112	1	156	1	1181	12	1.02	83.2	25.5	
Deaths per cent. of annual admissions	1.8		-		1.1		0.9		0.6							
Admissions per cent. of total annual admissions from fever	93.0		89.6		79.9		61.9		79.2							
Deaths per cent. of total annual deaths from fever	61.5		-		25.0		11.1		16.6							

TABLE X.—*Tabular Statement of the Admissions and Deaths from Intermittent Fever, in the European Hospital at Bombay, for the Five Years from 1849 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Admissions from Fever; and of Deaths on Total Deaths from Fever for the same Period.*

	1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Adms. per Cent. of	Fevers.	Deaths per Cent. of Total Fever.
January	7	-	8	2	2	-	6	-	9	-	32	2	6.3	66.6	50
February	7	-	3	-	6	-	3	-	6	-	25	-	-	65.8	-
March	7	-	10	-	5	-	4	-	6	-	32	-	-	74.4	-
April	11	-	1	1	4	-	5	-	9	-	30	1	3.3	66.6	33.3
May	16	-	9	-	9	-	6	-	20	-	60	-	-	65.9	-
June	15	-	5	-	5	-	6	-	15	-	46	-	-	58.9	-
July	8	-	8	1	6	-	20	-	11	-	53	1	1.9	60.9	25.0
August	3	-	7	-	8	-	13	-	6	1	37	1	2.7	59.7	33.3
September	8	-	8	-	4	-	4	-	6	-	30	-	-	61.2	-
October	6	-	10	-	2	-	6	-	8	-	32	-	-	61.5	-
November	33	-	7	-	6	-	10	-	11	-	67	-	-	72.0	-
December	5	-	8	-	8	-	20	-	26	-	67	-	-	72.0	-
Total	126	-	84	4	65	-	103	-	133	1	511	5	0.98	65.6	20.8
Deaths per cent. of annual admissions	-	-	4.7	-	-	-	-	-	0.7	-	-	-	-	-	-
Admissions per cent. of total annual admissions from fever	79.7	-	59.5	-	55.5	-	65.6	-	64.5	-	-	-	-	-	-
Deaths per cent. of total annual deaths from fever	-	-	44.4	-	-	-	-	-	50.0	-	-	-	-	-	-

TABLE XI.—*Tabular Statement of the Admissions and Deaths from Ephemeral Fever, in the European General Hospital at Bombay, for the Five Years from July, 1838, to June, 1843; with Per-centage of Deaths on Ad-missions; of Admissions on Total Fever Admissions; and of Deaths on Total Fever Deaths for the same Period.*

	1838.		1839.		1840.		1841.		1842.		1843.		Total.		Monthly Average.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions on Total Fev.	Deaths on Total Fever
January	-	-	1	-	7	-	3	-	1	-	1	-	13	-	12.4	-
February	-	-	-	-	4	-	1	-	-	-	-	-	5	-	8.9	-
March	-	-	1	-	6	-	-	-	-	-	1	-	8	-	10.8	-
April	-	-	2	-	5	-	-	-	-	-	2	-	9	-	10.2	-
May	-	-	3	-	12	-	1	-	1	-	4	-	21	-	13.6	-
June	-	-	10	-	4	-	-	-	9	-	-	-	23	-	10.5	-
July	-	-	5	-	2	-	-	-	-	-	-	-	8	-	3.7	-
August	-	-	8	-	3	-	1	-	3	-	-	-	17	-	9.5	-
September	-	-	3	-	5	-	4	-	-	-	-	-	15	-	10.5	-
October	-	-	16	-	4	-	2	-	-	-	-	-	23	-	7.2	-
November	-	-	6	-	2	-	-	-	1	-	-	-	9	-	4.6	-
December	-	-	1	-	-	-	1	-	5	-	-	-	8	-	8.5	-
Total	8	-	56	-	54	-	13	-	20	-	8	-	159	-	8.7	-
Deaths on admissions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Admissions on total fever ad-missions	7.8	-	15.1	-	19.9	-	2.8	-	4.3	-	4.6	-	-	-	-	-
Deaths on total fever deaths	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

JAMSETJEE JEJEEBHOY HOSPITAL.

TOTAL FEVER ADMISSIONS.

Table XII. gives the total admissions of fever into this hospital from 1848 to 1853, a period of six years; they amount to 2473.* Compared with the European General Hospital, it shows a smaller proportion of fevers to total admissions; it is 9·8, that in the European General Hospital for the same years is 13·5 per cent. In the half year from June to November the excess is also less; the proportion is 10·8 per cent. of the total hospital admissions, while in the half year from December to May it is 8·6. But in comparing this proportion with the average of the European General Hospital we must bear in mind that for the years included in this Table (XII.) the difference between the two half years was in the European General Hospital much below that of the ten preceding years. It was from June to November 14·4; from December to May 12.

The mortality from fever in this Hospital has been 12·4 per cent.; that in the European General Hospital was 3·3.

In this difference we have an illustration of the kind of errors to which statistical statements must inevitably lead when applied to etiology and therapeutics, unless used by those who are familiar with all the circumstances of the individuals to whom the figures relate.

A statistical inquirer, from a comparison of the mor-

* The selected clinical cases, so frequently adverted to, were selections from this number.

tality in the European General Hospital for Europeans, and the Jamsetjee Jejeebhoy Hospital for natives, as shown in tables V., VI., VII., and XII., might infer that fever is a more fatal disease in natives than in Europeans, and that the treatment of the disease was not so well understood in the one hospital as in the other.

But I, who have had a lengthened clinical experience in both hospitals, know that these inferences would be altogether erroneous. The high mortality in the Jamsetjee Jejeebhoy Hospital is simply due to the very destitute state of a large proportion of its inmates, and the very advanced stages of disease at which they seek for admission.

TABLE XII.—*Tabular Statement of the Admissions and Deaths from Remittent and Intermittent Fever*, in the Jamsetjee Jejeebhoy Hospital at Bombay, for the Six Years, from 1848 to 1853; with Per centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1848.		1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions on total.	Deaths on total.
January	20	11	34	5	27	8	42	7	27	1	33	8	183	40	21.8	8.7
February	25	5	24	7	16	6	39	6	14	2	28	4	146	30	20.6	7.2
March	14	3	25	4	28	9	28	-	26	3	18	3	139	23	16.5	6.5
April	18	1	22	5	26	5	23	1	28	3	51	1	168	16	9.5	7.9
May	17	3	24	2	48	5	29	1	35	7	65	2	218	20	9.1	9.9
June	14	3	22	2	35	9	29	-	44	3	50	3	194	20	10.3	6.5
July	29	2	30	5	32	6	45	2	33	2	40	2	210	19	9.04	6.2
August	26	2	49	7	32	5	32	1	35	1	40	2	214	18	8.4	5.5
September	21	2	42	11	43	8	33	2	27	1	36	2	202	26	12.3	8.3
October	27	5	48	4	67	6	34	3	34	5	64	4	274	27	9.9	7.8
November	9	3	33	3	77	9	40	1	48	7	44	3	251	26	10.3	7.8
December	30	6	47	6	72	19	28	4	44	3	53	5	274	43	15.7	10.8
Total	250	46	400	61	504	95	402	28	395	39	522	39	2473	308	12.4	7.5
Deaths per cent. of annual admissions	18.4		15.2		18.8		6.9		9.8		7.4					
Admissions per cent. of annual admissions	7.1		9.8		10.8		9.08		9.5		11.9					
Deaths per cent. of annual total deaths	8.3		8.8		11.8		3.7		5.9		6.04					

* This Table might have been entitled "Fever of all Kinds," for the admissions under the head "Ephemeral" have been very few.

JAMSETJEE JEJEEBHOY HOSPITAL.

INTERMITTENT FEVER.

The proportion of admissions of this type to the total fevers is 69·1; that for the half-year from June to November being 72·5; that from December to May 63·9. The mortality is 0·9.

In the proportion of intermittents in the two half-yearly periods, we have the converse of what is stated in respect to the European General Hospital. In it the greater proportion is in relation to the half-year including the cold months of the year. In the Jamsetjee Jejeebhoy Hospital it is in relation to the half-year which includes the malarious months.

This discrepancy is to be explained by the fact, that, in the European General Hospital, a considerable proportion of the admissions from intermittent fever are of individuals who have arrived from other malarious countries, and who, reaching Bombay in the cold season, have the disease re-excited, not by the malaria of Bombay as an exciting cause, but by cold or other atmospheric states acting on a tainted system. This is not the case in the Jamsetjee Jejeebhoy Hospital to nearly the same extent.

TABLE XIII.—*Tabular Statement of the Admissions and Deaths from Intermittent Fever, in the Jamsctjee Jejeebhoy Hospital at Bombay, for the Six Years from 1848 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Fever Admissions; and of Deaths on Total Fever Deaths for the same Period.*

	1848.		1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths on Admissions from Fever.	Deaths on Total Fever.	Deaths on Total Fever.
January -	9	3	16	2	17	1	26	-	17	-	22	-	107	6	5.6	58.5	15.0
February -	15	1	9	-	6	1	31	1	10	-	18	-	89	3	3.4	60.6	10.0
March -	9	-	11	-	13	-	18	-	15	-	13	-	79	-	-	56.8	-
April -	10	-	6	-	15	-	18	-	19	-	43	-	111	-	-	66.1	-
May -	8	1	12	-	24	-	22	-	26	1	56	-	148	2	1.4	67.8	10.0
June -	10	-	14	-	20	-	27	-	35	-	46	-	152	-	-	78.3	-
July -	26	-	14	3	24	-	38	-	30	-	37	-	169	3	1.8	80.4	15.8
August -	15	-	24	1	21	-	24	-	27	-	29	-	140	1	0.7	65.4	5.5
September -	16	-	20	-	34	-	20	-	20	-	31	-	141	-	-	69.8	-
October -	14	1	30	-	45	-	19	-	26	-	51	-	185	1	0.5	67.5	3.7
November -	4	-	20	-	51	-	34	-	38	-	39	-	186	-	-	74.1	-
December -	21	1	27	-	51	-	23	-	36	-	44	-	202	1	0.49	73.7	2.3
Total -	157	7	203	6	321	2	300	1	299	1	429	-	1709	7	0.9	69.1	5.5
Deaths per cent. of admissions	4.5		2.9		0.6		0.3		0.33		-						
Admissions per cent. of total admissions from fever }	62.8		50.8		63.7		74.6		75.7		82.2						
Deaths per cent. of total deaths from fever }	15.2		9.8		21.0		3.6		2.6		-						

EUROPEAN GENERAL HOSPITAL.

REMITTENT FEVER.

Tables XIV., XV., XVI. show that the proportion of this type, to the total fevers, is 16·6 * per cent.

When we compare the proportion in the half-years, from June to November, and December to May, we find that it was 19·8 per cent. in the former, and 13·6 in the latter.

The mortality from this type is, for the 15 years, 15·1 per cent. on the admissions, and 76·1 per cent. of the total deaths from fever.

In regarding the mortality from remittent fever in this hospital, it must be borne in mind that, from the variety in the inmates, and the not unfrequent advanced periods of admission, it is necessarily higher than that of European regimental hospitals.

* That 16·6 of this type, with the proportion of Intermittents, does not complete the total admissions, is to be explained by the abstraction of 8·7 for Ephemerals in the first quinquennial period.

TABLE XIV.—*Tabular Statement of Admissions and Deaths from Remittent Fever, in the European General Hospital at Bombay, for the Five Years from July, 1838, to June, 1843; with Per-centage of Deaths on Admissions; of Admissions on total Admissions from Fever; of Deaths from Total Deaths from Fever for the same Period.*

missions on total admissions

	1838.		1839.		1840.		1841.		1842.		1843.		Total.		Monthly Average for the Five Years.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per Cent. of Admissions.	Deaths per Cent. of total Fevers.	Deaths per Cent. of total Deaths from Fever.
January	-	-	3	-	4	-	3	2	3	-	2	2	15	4	26.6	14.1	80.
February	-	-	3	-	3	1	-	-	-	-	-	-	7	1	14.2	12.7	50.
March	-	-	2	-	-	-	-	-	2	1	1	1	7	1	14.2	9.4	33.3
April	-	-	8	1	1	-	1	1	4	1	1	1	19	3	15.7	21.5	60.
May	-	-	10	1	9	-	-	1	4	1	1	1	24	2	8.3	15.5	66.6
June	-	-	2	-	5	1	17	2	2	1	1	1	27	5	18.5	12.3	83.3
July	-	-	2	-	4	-	54	5	9	-	-	-	75	6	8.0	34.7	85.7
August	-	-	9	-	3	1	29	7	4	-	-	-	49	8	16.3	27.3	100.
September	-	-	12	2	3	1	6	1	3	2	-	-	34	6	17.6	24.1	75.
October	-	-	19	1	5	1	9	1	1	-	-	-	33	3	9.0	10.3	50.
November	-	-	8	1	16	2	-	-	4	2	-	-	33	5	15.1	17.	100.
December	-	-	5	3	2	-	1	-	3	1	-	-	13	4	30.0	13.7	50.
Total	-	-	83	9	60	6	114	19	39	9	8	3	336	48	14.2	17.6	72.7
Deaths per cent. of annual admissions	6.2		10.8		10.		16.6		23.		37.5						
Admissions per cent. of total annual admissions of fever	31.3		22.4		22.1		24.5		8.4		4.5						
Deaths per cent. of total annual deaths from fever	100.		81.8		85.7		82.6		60.		37.5						

TABLE XV.—*Tabular Statement of the Admissions and Deaths from Remittent Fever, in the European General Hospital at Bombay, for the Five Years from 1844 to 1848; with Per-centage of Deaths on Admissions; of Admissions on Total Admissions from Fever; and of Deaths from Fever for the same Period.*

	1844.		1845.		1846.		1847.		1848.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per Cent. of Admissions.	Admissions per Cent. of Total Fevers.	Deaths pr. Cent. of Total Deaths from Fever.
January	5	2	3	3	1	-	5	-	2	-	16	5	31.3	15.2	83.3
February	3	1	2	-	-	-	1	-	4	1	10	2	20.0	11.7	50.0
March	1	-	-	-	1	-	2	-	1	1	5	1	20.0	8.5	100.0
April	5	1	3	-	1	-	-	-	1	-	10	1	10.0	14.9	50.0
May	1	-	1	2	6	-	2	1	1	1	11	4	36.4	11.1	100.0
June	2	-	9	2	6	2	6	-	2	-	25	4	16.0	14.5	80.0
July	4	-	2	1	8	2	7	-	4	-	25	3	12.0	12.7	75.0
August	1	-	4	-	11	-	17	3	3	1	36	4	11.1	23.4	100.0
September	1	-	1	-	7	1	6	1	1	-	16	2	12.5	16.0	100.0
October	6	1	3	1	4	1	5	1	3	1	21	5	23.8	11.2	62.5
November	1	1	3	1	12	-	2	1	2	-	20	3	15.0	14.7	60.0
December	2	1	4	1	4	-	-	-	1	-	11	2	18.2	18.9	100.0
Total	32	7	35	11	61	6	53	7	25	5	206	36	17.4	14.5	76.6
Deaths per cent. of annual admissions	21.9		31.4		9.8		13.2		20.0						
Admissions per cent. of total annual admissions from fever	6.9		10.4		25.1		29.3		12.7						
Deaths per cent. of total annual deaths from fever	53.9		100.0		75.0		77.7		83.3						

TABLE XVI.—*Tabular Statement of the Admissions and Deaths from Remittent Fever, in the European General Hospital at Bombay, for the Five Years from 1849 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Admissions from Fever; and of Deaths on Total Deaths from Fever for the same Period.*

	1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per cent. of total Admissions.	Deaths per cent. of total Fevers.	Deaths from Fever.
January -	1	1	3	1	3	-	-	-	1	-	8	2	25.0	16.7	50.0
February -	-	-	3	1	4	2	-	-	-	-	7	3	42.8	18.4	100.0
March -	-	-	1	-	1	-	-	-	-	-	2	-	-	4.6	-
April -	2	1	-	-	1	-	1	1	-	-	4	2	50.0	8.9	66.6
May -	1	-	-	-	1	-	7	-	4	-	13	-	-	14.2	-
June -	3	1	6	-	3	-	4	-	4	-	16	1	6.2	20.5	100.0
July -	2	2	6	1	-	-	5	-	5	-	21	3	14.3	24.1	75.0
August -	2	-	6	1	-	-	6	1	1	-	15	2	13.3	25.8	66.6
September -	-	-	3	-	2	-	1	-	2	-	8	-	-	16.4	-
October -	3	-	4	-	3	-	4	-	2	-	16	-	-	30.8	-
November -	5	2	4	1	1	-	2	1	1	1	13	5	38.4	13.9	100.0
December -	4	-	1	-	1	-	3	1	6	-	15	1	6.6	16.1	100.0
Total -	23	7	33	5	23	2	33	4	26	1	138	19	13.7	17.7	79.2
Deaths per cent. of annual admissions	30.4		15.2		8.7		12.1		3.8						
Admissions per cent. of total annual admissions from fever	14.5		23.4		19.7		21.0		12.6						
Deaths per cent. of total annual deaths from fever	100.0		55.5		100.0		100.0		50.6						

JAMSETJEE JEJEEBHOY HOSPITAL.

REMITTENT FEVER.

The proportion of remittents to intermittents is 32·1 per cent.; double that of the European General Hospital. If the inference be drawn from this statement that the remittent is more frequent in natives, compared with the intermittent type, than in Europeans, it would be a correct deduction from the tables; but it would be an application of the figures to a question which they are in no respect calculated to solve. The fact is, that natives do not readily resort to a civil hospital for mild attacks of fever; therefore the proportion of the severer type is greater than in an European hospital, partly civil and partly military in its character.

In the half-year from June to November the proportion of this type is 29·; in the half year from December to May it is 36 per cent. We have found that, from June to November the proportion of remittents was greater, but that of intermittents was less, in the European General Hospital; whereas in the Jamsetjee Jejeebhoy Hospital the proportion of remittents was less, that of intermittents was greater. On the other hand, in the half-year from December to May intermittents were proportionally greater, and remittents less, in the European General Hospital; but in the Jamsetjee Jejeebhoy Hospital the proportion of remittents exceeded that of the intermittents, and fell short of that of the other half-year.

It may be suggested, in explanation of the greater proportional prevalence of remittent fever in the native inmates of the Jamsetjee Jejeebhoy Hospital, in the

half-year including the cold months, than in that including the malarious months—that many of them are instances of malarious fever, assuming the remittent character in consequence of inflammatory complication, pneumonia—or other—induced by cold, to the influence of which, as an exciting cause, the badly fed and clothed classes of the native community are very susceptible. The greater proportion of fever deaths in natives in Bombay, in the half-year from December to May, also appears in Mr. Leith's Mortuary Returns; it is—for the five years from February, 1848, to January, 1853—54·44 of the total mortality; whereas the proportion for the half-year from June to November is 45·55.

This fact is also to be explained in the same manner, with the addition that, as a large number of the returns are made from non-professional sources, it is probable that part of the mortality recorded as due to fevers has been caused by inflammations with symptomatic fever. This is Mr. Leith's opinion.

I have already explained the probable cause of the proportional excess of intermittents in the European General Hospital in the non-malarious half of the year. We have found, however, that the remittent type is in greatest proportion in the malarious six months—for then we have a more fixed community, and more of the influence of the malaria of the island as an exciting cause.

TABLE XVII.—*Tabular Statement of the Admissions and Deaths from Remittent Fever, in the Jansetjee Jejeebhoy Hospital at Bombay, for the Six Years from 1848 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Fever Admissions; of Deaths on Total Fever Deaths for the same Period.*

	1848.		1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions on Total Fever	Deaths on Total Fever	Deaths.
January	11	8	18	3	10	7	16	7	10	1	11	8	76	34	44.7	41.5	85.0
February	10	4	15	7	10	5	8	5	4	2	10	4	57	27	47.3	39.05	90.0
March	5	3	14	4	15	9	10	-	11	4	5	3	60	23	38.3	43.1	100.0
April	8	1	16	5	11	5	5	1	9	3	8	1	57	16	28.1	33.9	100.0
May	9	2	12	2	24	5	7	1	9	6	9	2	70	18	25.7	32.1	90.0
June	4	3	8	2	15	9	2	-	9	3	4	3	42	20	47.6	21.6	100.0
July	3	2	16	2	19	6	7	2	3	2	3	2	51	16	31.4	24.3	84.2
August	11	2	25	6	11	5	8	1	8	1	11	2	74	17	22.9	34.6	94.4
September	5	2	22	11	19	8	13	2	7	1	5	2	71	26	36.6	35.1	100.0
October	13	4	18	4	22	6	15	3	8	5	13	4	89	26	29.2	32.5	93.3
November	5	3	13	3	26	9	6	1	10	7	5	3	65	26	40.0	25.9	100.0
December	9	5	20	6	21	19	5	4	8	3	9	5	72	42	58.3	26.3	97.7
Total	93	39	197	55	203	93	102	27	96	38	93	39	784	291	37.1	32.1	94.5
Deaths per cent. of annual admissions - - -	41.9		27.9		45.8		26.4		39.5		41.9						
Admissions per cent. of total annual Fever admissions - -	37.5		49.2		40.3		25.4		24.3		17.8						
Deaths per cent. of total annual Fever deaths - - -	84.8		91.6		97.7		96.4		97.4		100.0						

CHAPTER IV.

A SHORT SKETCH OF THE PLAGUE OF THE LEVANT; OF YELLOW FEVER; AND OF TYPHUS, TYPHOID AND RELAPSING FEVERS OF COLDER CLIMATES.

WE are apt to dwell too exclusively on the results of personal experience in fever, and to magnify the proportion which our own sphere of observation bears to the whole field of febrile disease. It will therefore be useful to bring before the mind a general outline of some of the leading features of the forms of idiopathic fever which are met with in other countries; and with which my personal acquaintance is either none, or very limited. This proceeding will tend to show that the same general principles of etiology, pathology, and therapeutics are applicable to these as to the intermittent and remittent fevers of India.

PLAGUE.—History has made us familiar with the disease called Pestis, or Plague. It was for centuries the cause of much mortality in European countries. Marseilles and Moscow have suffered from its ravages; and in the writings of Sydenham, we have an account of its last visitation in London in 1667. Since then it has been unknown in England, and has gradually ceased to appear in the other countries of Europe.

It is now confined to Egypt, Syria, and Asia Minor. It appears every year, or two or three years, in the cities of Alexandria*, Cairo, Smyrna, Damascus,

* When I was at Alexandria in June, 1854, I was told that the plague had been absent for twelve years.

Aleppo, Constantinople. It commences in the month of March, continues for two or three months, and then ceases till the March of the following year.

This disease, it is said, requires, as a condition of its prevalence, that the temperature of the air should not be much below 60 nor above 80.

The plague is a febrile disease, but is also attended with local phenomena either inflammatory or hæmorrhagic in character. It is caused by a specific poison, which, acting on the blood and all the organs engaged in vital actions, deranges these actions. The inflammatory phenomena may perhaps be considered as analogous to those of gout, rheumatism, smallpox, measles; processes set up with the view of eliminating the poison from the blood.

A distinct idea of the nature of plague may be best acquired by considering, first, the character of the febrile *symptoms*; then that of the *local phenomena*; and, finally, by relating the different local phenomena to the varying character of the febrile symptoms.

1st. In regard to the febrile symptoms, we shall find the same kind of variety that is observed in other idiopathic fevers. Where the influence of the poison is little intense, and the powers of resistance of the individuals affected are great, then we shall have a mild disease, — the febrile disturbance will be of little severity, and be succeeded by inconsiderable depression. When, however, the febrile reaction has been great in consequence of an intenser poison and feebler powers of resistance, then an adynamic state, with all its attendant phenomena, will be developed. Or when the poison has been still more intense and the state of predisposition greater, then we shall have congestive phenomena

from the commencement, and early death without reaction, or after it has become imperfectly established.

In the mildest form of the disease there is nausea and languor with febrile excitement and restlessness at night and remissions towards morning, frequently preceded by distinct perspiration. These symptoms may continue for a week or fourteen days before recovery takes place. The exacerbations gradually become less in degree, and the remissions more complete, and this gradual amelioration is characterized by freer perspiration at the close of the exacerbation. The disease in this mild form, however, is of comparatively rare occurrence.

In the second degree of severity,—and this is the most frequent form of the disease,—the febrile exacerbation towards night is much greater in degree, is attended with restlessness, nausea, often bilious vomiting, and a more developed state of the pulse. Towards morning some degree of perspiration takes place, then a marked remission, to be succeeded towards noon by an exacerbation, milder however than that of the night.

This midday exacerbation is succeeded by an evening remission, often preceded by some degree of perspiration, and then at night the severer exacerbation recurs. The earliest exacerbations are the least severe. As the disease advances to the third, fourth, and fifth days, the listlessness is associated with delirium and tendency to stupor. The eyes have a muddy appearance, and give a drunken expression to the countenance. There is a sense of anxiety, and pain much complained of at the region of the heart. The tongue is white and coated, and much expanded.

In cases of this degree that do well, the perspiration at the close of the paroxysm which precedes the morn-

ing of the third day, increases in quantity and the remission is more marked. This, however, is again less remarkable on the fourth day; on this the exacerbations are greater and the remissions and the perspiration less. But on the morning of the fifth day*, the perspiration is still more profuse than on the third, and the succeeding remission is more marked. Now from day to day there is a gradual decrease in the duration of the exacerbations, and increase in that of the remissions, till the final cessation of the febrile phenomena in the course of the second week. While this progressive amelioration is taking place in the febrile symptoms, the associated phenomena also lessen in degree; the delirium and tendency to stupor pass away; the restlessness and sense of oppression at the præcordia decrease and disappear. The tongue becomes gradually cleaner, and the countenance resumes its natural expression.

In those cases in which the progress is unfavourable, the marked perspiration on the third and fifth day is wanting. The exacerbations are of longer, the remissions of shorter duration. The febrile state tends to become continued; there is an increased degree of the muddy drunken expression of the eyes; the stupor is greater and soon passes into coma; the anxiety at the præcordial region is more aggravated in character; the pulse becomes more frequent and loses strength; the tongue, increased in size, becomes dry and of brown colour. In fact, then, we have here very much the same phenomena which present themselves in remittent fever, which has become aggravated by continuance of the febrile state and evolvment of an adynamic condition. In these unfavourable cases of the second de-

* We have in these phenomena a marked tertian tendency.

gree, death generally takes place in the way of coma, between the seventh and the fourteenth day.

The third or severest form of plague,—that to which the name Malignant has been given,—bears the same relation to the other forms that the congestive form of remittent fever does to the other forms of that disease.

The initiatory stage of depression is excessive in degree, and is either not recovered from at all, or a very imperfect reaction takes place.

When there is no reaction death may occur during the first twenty-four hours. When the reaction is partial the fatal result may be postponed till the third or fourth day, seldom if ever beyond the fifth day.

The symptoms are chilliness, vomiting, headache, confusion of ideas, pulse feeble and oppressed, skin coldish, much anxiety and pain at the præcordial region, urgent thirst, muddy eyes, occasional delirium, stupor, coma, tongue at first moist, then brown. Death takes place partly in the way of coma, partly in that of asthenia.

In the general symptoms which have been detailed, if we except the peculiar muddy appearance of the eyes, there is little that may not be found under one or other of the varieties in which remittent fever presents itself.

But the peculiarity of plague is not in the character of its febrile symptoms, but in that of the local phenomena which are associated with them, and these I now proceed to notice:—

1st. Inflammation and swelling of some of the lymphatic glands, is a local symptom of very frequent occurrence, and one that is looked upon as very characteristic of the disease.

The glands most commonly affected are the inguinal

and axillary. The parotid, maxillary, and cervical are so occasionally, but very seldom. The formation of these buboes is first indicated by darting pain in the region of the gland, and then a deep-seated hard tumour shortly becomes perceptible; this increases in size, and in the course of ten days, if the disease progresses favourably, suppuration is gradually established. Then the abscess bursts and undergoes a slow process of healing, leaving behind it a well-marked scar. The occurrence of bubo alone, thus passing on to suppuration, is the local phenomenon which attends the mild or first form of the disease.

2nd. The next most frequent local affection is the formation of carbuncles on different parts of the body. It commences with a vesicle of roundish shape and slightly protuberant. The upper surface is uneven, wrinkled, of greyish appearance, and contains a dusky yellow or blackish fluid. On this being discharged the surface beneath has a dark reddish appearance with a gangrenous spot in the centre, which gradually extends and is surrounded by a dark blush of redness.

In cases that terminate fatally the gangrenous crust remains dry. In those which progress favourably it gradually separates and is thrown off, leaving behind a deep ulcer which shows little tendency to heal.

The carbuncles sometimes appear very early in the disease, at others they do not show themselves till it has somewhat advanced. They in general are associated with buboes.

Carbuncles and buboes are the local phenomena which characterize the second or severer form of the disease,—that which is the most common of the three forms.

3rd. Petechiæ, or large purple patches or streaks, are other local phenomena. They occur on the chest, neck, and face; are of very unfavourable import, and make their appearance in general shortly before death. They appear in unfavourable cases of the second form, in association with, and subsequent to, the buboes and carbuncles. They also occur before death in the malignant form of the disease, more especially in those instances in which there is an imperfect reaction, and in which the fatal result is postponed till the third or fourth day. In this malignant form of the disease, buboes and carbuncles are of infrequent occurrence. The blood in the plague is much deteriorated in quality. When drawn it is dark and tarry-looking, and it is to this circumstance, no doubt, that are due the hæmorrhages which frequently complicate the advanced stages,—hæmorrhage from the nose, the uterus, or vomiting of dark grumous matter, or similar discharges from the bowels.

Such, then, is a short sketch of the symptoms which present themselves in this disease. We have recognized in them the evidences of a depressed condition of all the vital actions of the system, also a deteriorated state of the blood, associated with local phenomena. Some of which,—the buboes and the carbuncles,—may be considered as instances of inflammatory action, having in view a poison elimination. The petechiæ and purple patches are mere forms of hæmorrhage, due, equally with those which take place from mucous surfaces, to the deterioration of the blood.

Then arises the important question, What is the nature of the poison which produces these violent derangements of the animal system? It is one capable of being reproduced in the human system, and of being communicated to others.

According to some it requires actual contact with the sick or with fomites charged with the poison. According to others it is communicable to some distance from the sick, through the medium of the atmospheric air around them, which becoming impregnated with poisonous particles, is inhaled by the healthy. On this question there has been much debate, for the practical rules of a quarantine system are grounded on the belief of the disease being communicable by contact alone.

It has also been much discussed whether the poison of plague is capable of generation only in the human system, and proceeds only from an infected individual or infected fomites. Or whether it is not endemic in character, originating in miasmata from the earth, or produced by the vitiated atmosphere of the unclean localities which form its usual habitat, and when thus produced, becoming capable of reproduction in the human system, and of communication from individual to individual—of communication in all probability by the atmospheric air, not however to any great distance from the sick; and, probably, chiefly by air which has been previously vitiated and rendered impure. The influence of the poison is also favoured by the state of predisposition of those exposed to it.

It forms no part of my subject to enter into these discussions. Still, it is impossible to avoid the conclusion that the strictly contagious doctrines on which quarantine systems, as hitherto recognized, are founded, are not in harmony with our etiological views of other cognate febrile affections.

In regard to the *treatment* of plague. As the disease no longer exists in countries in which it formerly prevailed, it is very evident that preventive

means, on sanitary principles now well understood, are very powerful towards lessening the evils of plague.

A large proportion of the worst cases terminate fatally, little influenced by medical treatment. Nor is this to be wondered at: we have no antidote by which the poison can be neutralized; we have no means of at once restoring the deteriorated system which has predisposed to the attack. But the indication of cure in this, as in other aggravated forms of zymotic febrile disease, is clear enough. We must, as Cullen said, endeavour to obviate the tendency to death, and thus gain time to admit of the elimination of the poison from the blood.

YELLOW FEVER.—This disease has been found to prevail only in certain latitudes, but not in every country within their range. The range is said to be between 40° north and 20° south latitude, and in countries the mean of whose summer temperature is from 75 to 80.

It is a common disease in some parts of America—as New York, Philadelphia, Boston, Vera Cruz. It also prevails more or less in the West Indian Colonies, as Jamaica, Barbadoes, Domingo, Grenada. It is also well known on the African coast—at Sierra Leone and Bulam. It has, moreover, appeared in European countries at different times—as at Gibraltar and Leghorn. It seems to prefer localities in the proximity of marshy grounds, which are sometimes dry—as at the mouths of rivers. It is not, however, exclusively confined to situations on land, it has occasionally presented itself in ships at sea, cruising in the latitudes in which the disease prevails.

The yellow fever, has never, it is said, been observed in any of the countries of Asia.

Symptoms.—The attack is frequently preceded by premonitory symptoms of derangement, as nausea, sense of faintness, chilliness and general languor. The eyes present a dull watery appearance, and frontal headache, with pain in the orbits, is complained of; such symptoms may be present for two or three days, then some degree of chilliness takes place, not, however, generally to any great extent, and now succeed the phenomena of febrile reaction, characterized by a hot and dry skin, frequent pulse, severe pain of the head, back, and loins, and cramps of the calves of the legs. There is general restlessness, and the countenance is expressive of pain; it is usually flushed, and often swollen and bloated; the eye is injected, and has a heavy suffused appearance; the tongue is swollen, and covered with a white moist slimy fur. There is uneasiness at the epigastrium, and often vomiting; the respiration is hurried and anxious; there is occasional delirium, and tendency to stupor. Such symptoms as these may continue from twelve to thirteen hours, when the febrile state subsides, and is succeeded by one of collapse, in which the skin becomes cold and pale, with a tendency to hæmorrhage from the mucous surfaces.

Then again succeeds a stage of reaction, but less developed than the first. The surface of the skin and the conjunctivæ begin to assume a yellowish tinge, and the tint varies in different cases. The countenance becomes very anxious, and there is twitching of the arms and legs. The pulse loses strength; the skin is sometimes hot in parts, in others moist. The tongue becomes dryish, and covered at its root with a yellowish crust, whilst it is red at the tip and often tremulous. The lips are dry and parched, and often encrusted with

an oozing of blood. The epigastrium becomes uneasy on pressure, and the stomach very irritable — all ingesta and frequently bilious-looking matter being rejected. The secretion of urine is much diminished, and sometimes almost suppressed. There is either low muttering delirium or more or less of coma; and convulsions occasionally, though rarely, take place. Petechial spots sometimes appear on different parts of the body. These symptoms may continue from two to six or seven days, when another train of phenomena gradually develops itself. The countenance becomes more collapsed and anxious, the conjunctivæ of a deeper yellow, and the surface of the body also of a darker tint, yellow, greenish, or leaden colour. Petechial spots, and purple patches increase in extent and number. There is greater exudation of blood from the lips and mouth, and incrustation about the teeth. The tongue becomes dry, brown in the centre, florid and excoriated-looking at the tip and edges. The pulse becomes small and thready, and the voice feeble and hoarse. The epigastric tenderness increases, and is much aggravated by the least degree of pressure; then vomiting of a grumous-looking fluid takes place, black vomit as it has been termed. Now all the phenomena of collapse and exhaustion increase, and death follows, sometimes by asthenia alone, at others partly by asthenia, partly by coma.

This description may give some general idea of the nature of yellow fever. It varies, however, very much, in the same manner as remittent fever. There may be cases in which the febrile reaction runs high; to these the term Inflammatory may be applied. There may be others in which the adynamic or typhoid phenomena have early developed themselves, and have been preceded by a great degree of febrile reaction; to these

the appellation Adynamic has been given. Then there are cases in which the primary stage of depression has either not been followed by reaction, or by a very imperfect one; this is the Malignant or Congestive form of the disease, frequently proving fatal during the first twenty-four hours, rarely extending beyond the third day.

The symptoms which are held to be chiefly diagnostic of this form of fever are the pain of head and loins, the injected conjunctivæ, the great prostration of strength, the tender epigastrium, the dry tongue with raw and florid edges, the yellow tinge of the skin, the defective secretion of urine, the passive hæmorrhages, and the dark coloured grumous vomiting. The prognosis is in general very unfavourable. The mortality is great. In severe epidemics often almost all the early cases prove fatal, and the rate of mortality seldom falls short of one half, and very generally it is much more. The phenomena which indicate depression of the vascular and nervous systems and deteriorated state of the blood are the most unfavourable prognostic symptoms—as cold surface, weak pulse, tendency to faint, deep sighing, constant vomiting, tremors, subsultus, hiccup, delirium, coma, a deep yellow tinge of the surface, petechiæ and purple patches, hæmaturia, dark discharges from the bowels, and the black vomit.

The favourable symptoms are the pulse continuing of some strength after the third day, the skin being soft, the absence of vomiting and much pain of head, free perspiration, abundant secretion of high-coloured urine and free excretion from the bowels, the evacuations being well tinged with bile.

The whole duration of the disease varies from three to eight or nine days. In some rare cases it has been protracted to ten or twelve.

In regard to the *pathology* of yellow fever, the various vital actions are depressed and the blood deteriorated from the presence of a poison. There is, also, we may believe, an additional cause of blood deterioration in the circumstance of the excretions, chiefly of the liver and kidneys, being imperfectly performed; and in this we have also in part the explanation of the discolouration of the surface of the body. In the examination of the body after death in fatal cases, similar discolourations of the internal tissues, as well as of the serous transudations, are found. There are moreover spots and patches of extravasated blood on the different membranes and surfaces, and in the substance of organs, similar in character to the petechial spots and purple patches present in the cutaneous tissue.

Of the nature of the change effected in the condition of the blood, there is the same want of precise information, which obtains in respect to all diseases, in the pathology of which an altered state of the blood takes a prominent part.

In respect to the *causes*. That state of constitution present in Europeans on their recent arrival from colder climates into those of very elevated temperature,—a constitution robust and plethoric, and with a high heat-generating power—that condition which we found to be essential to the production of the ardent continued fever of warm climates, is very predisponent to attacks of yellow fever in its most aggravated form.

The ordinary debilitating, predisposing causes are also influential in creating a susceptibility to attacks from this disease. It is one also more liable to attack during the period of youth and maturity, than that of childhood or old age. It is said that those who re-

cover from a first attack are protected from a second. A specific poison is considered to be the exciting cause, and we have in respect to it very much the same difference of opinion of its origin and mode of propagation as obtains in regard to the plague.

The question is, whether the disease is of malarious endemic origin; or proceeds from a poison originating in the human system, only reproducible in it, and communicable from the sick to the healthy. There may be the mixed view—that it is endemic in origin, but reproducible in the human system and communicable. Whichever view be the correct one, it would seem to be certain, that the propagation of the poison has relation to atmospheric states; is more rapidly generated, and more easily spread in an atmosphere loaded with moisture, and of elevated temperature.

Yellow fever has been frequent in many of the British colonies, and has caused much mortality in troops and crews of ships; therefore, these questions relating to the origin and nature of the cause, have, during the last fifty years, been warmly discussed by military and naval medical officers.

Nor as yet are all agreed. The opinion that it is endemic in its origin, and becomes, under favourable circumstances, infectious, seems to me the most probable, not only in respect to yellow fever, but also plague, and the adynamic fever which prevailed at Pali and other parts of India.

The best mode of treatment has also been the subject of much difference of opinion. Free blood-letting, mercurial influence, and purgatives have had their advocates. But in a disease in which prostration soon comes on, and the blood becomes deteriorated, it is evident, on the most ordinary therapeutic principles,

that, as a rule of practice, both blood-letting and mercury must be injurious.

Saline remedies were at one time confidently recommended, with the view of supplying an assumed deficiency in the salts of the blood.

But here, as in the plague and all diseases—in which an intense poison prostrates the vital actions, and destroys the constitution of the blood—the strength of medical science must ever be, by careful study of the predisposing and exciting causes, to prevent their occurrence, if not altogether, at least in their severer forms.*

FEVERS OF THE COLDER CLIMATES—TYPHUS, TYPHOID, RELAPSING FEVER, AND FEBRICULA.—The subject of continued fever in England has, during the last two or three years, received much elucidation from the observations and writings of Dr. Jenner. His views are, I believe, now very generally adopted.

Dr. Jenner's opinion is, that under the general term, Continued Fever, four distinct febrile affections have been confounded. He describes them in the following summary manner:—

1. *Febricula*.—In this, chills alternate with flushes of heat, there is headache, a white tongue, constipation, scanty and high-coloured urine, skin dry and above the natural temperature, and frequency of pulse. The fever terminates in from two to seven days, and is caused by excesses, fatigue, or exposure to vicissitudes of weather. It depends then on ordinary exciting causes, not a

* I have not thought it necessary to make special reference to the sources from which the facts of this sketch of the plague and yellow fever have been derived. It was written some time since, and formed part of my course of lectures in the Grant College.

specific poison; and, as already stated, is similar in character to the milder and common continued fever of warmer climates, also produced by ordinary exciting causes.

2. *Relapsing Fever*.—This fever is produced by a specific cause, is attended with shivering, a sense of chilliness, headache, vomiting, white tongue, epigastric uneasiness, constipation, enlargement of the liver and spleen, high-coloured urine, frequent pulse, heat of skin, and sometimes jaundice. It terminates by apparent convalescence from the fifth to the eighth day; then in about a week afterwards, there is relapse; that is, there is repetition of the symptoms present during the first period of attack. After death, the spleen and liver are found considerably enlarged, but no marked congestion of other internal organs.

3. *Typhoid Fever*.—This form depends also on a specific cause, is attended with shivering and sense of chilliness, headache, and the appearance of successive crops of slightly elevated rose-coloured spots, about the eighth or twelfth day, chiefly on the trunk, and disappearing during pressure from the finger. The pulse is frequent; there is sonorous rhonchus, diarrhoea, fulness and tension of abdomen, with resonance and uneasiness, and sense of rumbling in the right iliac region. Increased splenic dulness, delirium, a tongue dry and brown, prostration of strength, and termination about the thirtieth day. In the examination of fatal cases, the mesenteric glands are found enlarged, Peyer's patches ulcerated, and the spleen increased in size.

4. *Typhus*.—This fever is also produced by a specific cause; is attended with shivering and sense of chilliness, headache; an eruption of mulberry-coloured spots about the fifth or sixth day, at first slightly elevated,

and disappearing under pressure, but in two or three days losing the elevated character, and only becoming paler under pressure; then becoming of more purple tint at their centres, and being uninfluenced by pressure, except at their circumference. The eruption is most abundant on the trunk and extremities, but very rare on the face, and does not come out in successive crops as in typhoid fever. There are, at the same time, paler spots, to which the term sub-cuticular has been applied. To the spotted character of the surface, resulting from the two forms of eruption, the term mulberry rash has been given.

The pulse is frequent, there is delirium, the tongue is brown and dry. There is prostration of strength, and the fever terminates about the twenty-first day. After death, marked congestion of various organs is met with, and, in young subjects, increased volume of the spleen.

Remarks.—The relapsing fever is seldom fatal, and is not attended with adynamic symptoms, as typhoid and typhus. In the apparent convalescence and relapse we have a feature allied to the intermission of malarious fevers, and in the greater engorgement of liver and spleen, and the occasional jaundice, we have additional allied characters. The question, I think, may be put, whether the exhibition of quinine, after the cessation of the first attack, might not destroy the relapsing character of the disease. The difficulty in determining this point will consist in the doubt that must exist in respect to the diagnosis prior to the occurrence of the relapse. In typhoid and typhus fever adynamic symptoms are present. They are distinguished from each other by the difference in the character of the eruption; and in the first, the presence of symptoms indicative of

the affection of Peyer's glands. Relapsing, typhoid, and typhus fever are caused by specific poisons, and are believed to be infectious under favourable circumstances. According to Dr. Jenner, the cause of each is distinct from that of the others, as much so as the cause of measles is distinct from that of scarlatina, and both from that of small-pox.

Second attacks of relapsing fever are common, but rare of typhoid and typhus; an attack of one form is in no respect preventive of the others.

Dr. Jenner does not enter on the question of treatment, but the principle is sufficiently distinct. These fevers cannot be cut short, but must be met by time, watchfulness, attention to local complications; and in typhoid and typhus especially, by warding off prostration.

The typhus, typhoid, and relapsing fevers of Dr. Jenner are unknown in India.*

* My account of Dr. Jenner's views is taken from a French translation by Verhaeghe, published at Brussels in 1852, there being no English edition of the collected Reports.

CHAPTER V.

ON ERUPTIVE FEVERS.

SMALL-POX.

SECTION I.

SMALL-POX. — NOTES ON, AS OBSERVED IN THE JAMSETJEE JEJEEBHoy HOSPITAL. — PREVALENCE. — PREVENTION BY VACCINATION. — TABLE.

DURING five years of my service in the European General Hospital at Bombay, from July 1838, to July 1843, 32 cases of small-pox were admitted. Of these 25 took place in the months of January, February, March, and April; 4 in the month of November, that of 1839; and 3—one in each month—in May, June, and July; and in the months of August, September, October, and December, there was not, during these five years, a single admission from small-pox. There were 5 deaths, which gives a mortality of 15·6 per cent.

During the ten succeeding years—from 1844 to 1853—there were 49 admissions of small-pox into the European General Hospital, and of these 44 were in the five months from January to May. The deaths were 12, being a mortality rate of 25·6 per cent.

The tabular statement appended to these remarks exhibits the admissions from small-pox into the Jamsetjee Jejeebhoy Hospital for the six years from 1848 to 1853. They amount to 261; of these 250 took place in the seven months from January to July,—185

in the three months, February, March, and April,—and 4 in the four months from August to November, and 7 in December.—The deaths amounted to 104, being 39·8 per cent. of the admissions.

Though daily visiting the small-pox ward during the prevalence of the disease in these six years and the three preceding ones, it was in the months of December 1845, January, February, and March 1846, that I took immediate charge of the small-pox patients, and made the following notes on the disease, as it occurs in the hospital frequenting classes of the native community of Bombay:—

The number of admissions, and deaths from small-pox, during these four months, are shown in this tabular statement.

Years.	Months.	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.
1845	December - - - - -	-	5	5	2	-	3
1846	January - - - - -	3	10	13	4	5	4
"	February - - - - -	4	8	12	2	6	4
"	March - - - - -	4	26	30	7	12	11
Total - - -		-	49	-	15	23	-

It exhibits a mortality of 46 per cent. The fatal cases were, with very few exceptions, markedly confluent in character, and death took place on the 3rd, 4th, 6th, 7th, 8th, 9th, 10th, and 11th days of the eruption.

The cases which proved fatal before the seventh day of the eruption, were generally instances in which the eruptive fever had been marked by very urgent symptoms, such as delirium, much anxiety, vomiting, pain of loins, badly developed pulse; and had extended beyond the usual period, having in two instances con-

tinued till the fifth day. These symptoms were succeeded by a flat eruption, passing slowly from its papular to its vesicular state.

In these cases the urgent symptoms somewhat abated on the first appearance of the eruption, but in general recurred on the second and succeeding days, and proved fatal about the fourth and fifth with delirium, sinking pulse, and coma. Such form of fatal result is to be accounted for, in a majority of cases, by the circumstance of the febrile state being more or less congestive and adynamic in its type. There are, however, cases occasionally to be observed which prove fatal under very much the same train of symptoms, and at the same stage, in consequence of local congestions of blood taking place in important organs, — as the lungs, — during the eruptive fever, and, by their presence, preventing the free development of the eruption. I have seen more than one case fatal on the third and fourth day of a badly developed eruption, with complication of pneumonia marked by hurried breathing and rusty sputa, and dating back to the period of the eruptive fever.

The cases fatal after the seventh day of the eruption (and they constitute the greater number) were generally those in which the eruption had been copious and very confluent, and in which there had been present hoarseness, with more or less dyspnœa and cough. These signs of laryngeal and tracheal irritation increased towards the end of the maturative fever, and proved fatal then, or in the early days of the secondary fever. The eleventh was the latest day of fatal termination.

In none of the fatal cases were the symptoms usually termed malignant observed, as petechiæ, the pustules filling with dark-coloured serum, hæmaturia or other hæmorrhage. In a few of the successful cases, glan-

dular swellings, and the formation of small abscesses, were troublesome during convalescence. In none of them did injured vision take place.

The admissions from small-pox were, with four exceptions, confined to Mussulmans and Portuguese: many of the former were sailors, and probably strangers in Bombay; several of the latter had recently arrived from Goa. Of the affected with small-pox 7 were females, the rest males. The ages of 48 of the number were —

5 years and under	-	-	4
15 „ „	-	-	3
15 „ to 20	-	-	6
20 „ to 30 inclusive	-	-	29
30 „ to 40	-	-	4
40 „ to oldest, 55	-	-	2
Total -			48

I believe that almost all the admissions were of parties unprotected by vaccination or previous small-pox, but on these points it is often impracticable to obtain trustworthy information from the inmates of our hospitals; for they are admitted, not unfrequently, at stages of the disease when incapable of giving a connected history of themselves, and are often unattended by friends capable of supplying this deficiency.

Of the admissions which form the subject of these notes, there was only one in which vaccination was undoubted and the marks on the arms distinct. In this case the disease was very modified, and confined to a few vesicles on the face, — and this, though (as is usually observed) the initiatory fever had been very well marked.

The following 8 fatal cases illustrate some of the observations which have just been made—as the con-

gestive and adynamic phenomena, and the occasional relation of the former, with retarded eruption, to a coexisting pneumonia. They further, when viewed in connexion with the remarks which precede them, and the mortality rate (40·8) of my hospital experience, deduced from 390 cases*, do not confirm Dr. Mackinnon's opinion that the people of Hindostan are mildly affected by variola.†

61. *Small-pox fatal on the Ninth Day of the Eruption, with Laryngeal Symptoms and Exhaustion.*

Moideen Mahomed was admitted into Hospital on the 17th February, 1846, on the third day of the eruption, which was coming out well. On the fifth day, he complained a good deal of cough; and leeches were applied to the top of the sternum, and antimonials were given. On the eighth day of the eruption the pustules on the face began to crust. The tongue was moist, the pulse 116, of moderate strength. On the following day the eruption was observed to be flaccid and pale; the pulse feebler, the tongue more coated, and the breathing hurried. He died in the course of the night.

62. *Small-pox with probable Pneumonia.—Congestive Symptoms.—Retarded Eruption.—Cerebral Affection and Death the Third Day of the Eruption.*

Francis Christian was admitted on the 21st February, after five days' illness with fever. The day after admission he complained of cough, and on the following day there were, in addition, dyspnœa, anxiety, and delirium at times; and the eruption began to appear. On the 24th, the second day of the eruption, he was free from febrile heat, but there had been delirium during the night. The pulse was ninety-five and feeble, and the eruption had not advanced. He continued delirious during the day with feeble pulse and retarded eruption. There was delirium during the night, and on the following day—the third of the eruption—he was drowsy and the extremities were cold,

* I have added to the 261 cases of the appended Return 129 treated in 1845, 1846, 1847.

† The Indian Annals of Medicine, No. iii. pages 150. 155.

the eruption stationary. He died at night. Some leeches had been applied to the temples; a blister to the nucha; sinapisms to the feet; and stimulants of ammonia were given.

63. *Small-pox.—Congestive Symptoms after the Appearance of the Eruption, which was retarded and purplish.—Death with Drowsiness on the Fourth Day of the Eruption.*

Antonio de Souza was admitted on the 21st February, suffering from the initiatory fever, with headache and pain of loins since the preceding night. During the three succeeding days he complained of headache, vomited frequently; the respiration was hurried, he was restless, and the pulse was rapid and feeble. These symptoms were, however, less urgent on the third day. On the fourth day after admission a copious eruption appeared on the upper parts of the body, and the symptoms from which he suffered during the initiatory fever were much alleviated. On the second day of the eruption he complained of sore throat. The pulse was 116 and easily compressed. The eruption came out badly, and the papulæ on the face were surrounded by a purplish tinge. On the following day—the third of the eruption—the tongue was dry and brown, the pulse feeble, the eruption flat and coming out badly on face, trunk, and extremities. He was drowsy and oppressed, and died early on the morning of the following day—the fourth of the eruption.

64. *Small-pox.—Pneumonia dating from the initiatory Fever.—Badly developed Eruption.—Death on the Seventh Day of the Eruption.*

Acbar Abdoola, a Lascar, was admitted on the 17th February, affected with frequent vomiting, urgent pyrexia, and complaining much of pain of loins. He had been ill three days. The following day there was much anxiety. The breathing was short, quick, and chiefly abdominal. On the right side of the chest, about the nipple, there spiratory murmur was confused and abrupt. The pulse was frequent and feeble, the skin hot, the vomiting frequent. On the succeeding day (the 19th) all the distressing symptoms had ceased, and the eruption of small-pox had come out copiously on the face and trunk. On the 20th the breathing was oppressed; leeches were applied to the sternum, and antimonials given. On the 22nd—

the fourth day of the eruption—the vesicles did not develop well and the pulse was frequent. On the following day the eruption was fuller, and confluent on the face, and rather more developed on the extremities. On the sixth day (the 24th) there was delirium with frequent pulse; the pustules were flaccid; there was occasional cough, with rusty sputa. These symptoms, with oppression of chest, increased towards evening, and he died on the afternoon of the following day, 25th February—the seventh of the eruption.

65. *Small-pox.—Badly developed Eruption.—Laryngeal Symptoms from the Third Day of the Eruption, and Death on the Seventh.*

Seedee Baruck, of twenty-three years of age, a stout African, was brought to the Hospital, on the 18th March, covered with the eruption of small-pox, seemingly its second day. On the 19th, eruption was confluent on the face and parts of the trunk. The pulse was 100. He complained of sore-throat, and leeches were applied to the top of the sternum. On the 20th, the pustules on the face showed a tendency to dry. He complained of pain at the top of the sternum; leeches were again ordered; but he would not allow of their application. On the 21st, he was restless and delirious, the breathing was oppressed, there was considerable hoarseness. The pustules on the trunk were flat, and those on the face were commencing to crust. On the 22nd, he was anxious and restless, and pointed to the top of the sternum as the seat of pain. The skin was hot. On the 23rd, the breathing was more oppressed and tracheal. There was much restlessness and anxiety, and he died in the evening—the seventh day of the eruption.

66. *Small-pox.—Badly developed and purplish Eruption.—Pneumonia and Death on the Eighth Day of the Eruption.*

Pedro Salvador, had never been vaccinated, arrived from Goa about three months before his admission into Hospital, on the 24th March. The eruption of small-pox, still papular, had been out two or three days and was copious on the face. There was heat of skin on the 27th March—the fifth or sixth day of the eruption—the areolæ on the thighs were of purplish tint. On the 28th, the eruption was flat on the trunk, and he complained of pain of the right side of chest, for which leeches were

applied. From this date the eruption did not advance. The breathing was more or less oppressed, and he died early on the 31st, the eighth day of the eruption.

67. *Small-pox.—Very confluent—Laryngeal Symptoms.—Drowsiness.—Death on Eleventh Day of the Eruption.*

Goolab Babool, a sailor of about thirty years of age, was admitted on the 15th March. He had been ill four days. On admission there was a papular eruption coming out on the face and trunk. On the following day the pulse was frequent and firm, and the breathing somewhat oppressed. There was occasional short cough and tendency to drowsiness. The tongue was dry and florid, and the eruption did not come out kindly. He was bled twice and a blister was applied to the nucha. On the 17th the eruption was coming out well, and the breathing was more natural, and the tongue moist. On the 18th—the fourth day of the eruption—he complained of sore-throat, and the eruption was becoming confluent on the face, and there were distinct pustules on the tongue. On the 19th, the face was more swollen, but the eruption on the trunk and extremities repressed and flat. He complained much of his throat, and some leeches were applied. On the 20th, the throat was still complained of, and the pustules on the face were beginning to crust. On the 21st, the face was much swollen, and there was hoarseness. On the 22nd, there was more marked failure of the pulse. There was much salivation and hoarseness. On the 23rd, the face was covered with black crusts. There was heat of skin, and oppressed breathing. On the 24th, he was restless and delirious. There was much hoarseness, and hawking of viscid phlegm. In this state he continued till the 26th—the eleventh day from the commencement of the eruption—when he died.

68. *Small-pox in a pregnant Female.—Premature Labour.—Adynamic Symptoms.—Death on the Seventh Day of Eruption.*

A Parsee female, about thirty years of age, was taken ill with small-pox in the eighth month of pregnancy. The initiatory fever ran high, and she was bled twice at the arm. On the fourth day of the eruption premature labour came on, and was followed by a good deal of uterine hæmorrhage. I saw her, for the first time, on the following day (September 20th, 1850).

She was restless; the pulse was 120, moderately full; the eruption copious; no swelling of the face. On the 6th day of the eruption there was much loss of strength of pulse. She took no food and refused all medicine. She was restless and wandering, and the eruption was not more distinct; there was neither hoarseness nor cough; stimulants were given and an opiate at bed-time. She rested badly on the evening of the seventh day, was restless and delirious. The pulse was barely perceptible. She had taken no food and refused the stimulants. She died at 10 P.M. on the seventh day of the eruption.

Treatment.—In the mild distinct small-pox with a moderate eruption, we may look for recovery; and, with the exception of mitigating the febrile disturbance with diaphoretics, aperients, if necessary, attention to the purity of the air and to cleanliness, further medical interference is unnecessary.

In the confluent form we have another illustration of the speedy prostration of vital actions under the sedative influence of the morbid cause, often aggravated by complicating derangement of important organs.

All that can be attempted under these circumstances is to endeavour, by stimulants, nourishment, and opiates, to sustain the system till the natural course and processes of poison elimination have been gone through. It need hardly be added that attention to purity of air and cleanliness are most important parts of these arrangements.

Finally, in respect to the initiatory fever the treatment should always be very guarded, and conducted in recollection that the dangers of prostration are likely soon to arise.

Prevalence and Prevention of Small-pox. — The best means of prevention of this still prevalent and fatal disease continue to engage the attention of the Indian Government. In the report of the Small-pox Commissioners appointed by the Government of Bengal in

1850; in Mr. Bedford's "Statistical Notes on Small-pox, Vaccination, and Inoculation in India," published in the *Indian Annals of Medicine*, No. ii., in 1853; and in Dr. Mackinnon's paper on the Epidemics of the Bengal and North-west Presidencies, published in the *Indian Annals of Medicine*, No. iii. 1854—we have the latest and fullest consideration of this subject in relation to Bengal and the North-western Provinces. In the few remarks which I am about to make, I shall confine myself in a great measure to the island of Bombay; for I believe that in the published mortuary registers of Bombay, prepared since the year 1848 with so much care and ability by Mr. Leith, we have data far more trustworthy than are to be obtained of any other part of India.

From these we learn that during the five years from 1st February, 1848, to 31st January, 1853, 4038 deaths took place from small-pox in Bombay, and of these 3203 occurred in children under seven years of age. The proportion of deaths from this disease to the total deaths was, for the five years, 5·83 per cent., the highest being 7·80, in the year 1848, and the lowest 2·70, in 1849.

The observation made by me in 1846*—founded on hospital records, and on Dr. Stewart's report of the small-pox epidemics in Calcutta of 1833, 1838, and 1843—that small-pox prevailed more in some months of the year than in others, is amply confirmed by Mr. Leith's registers; for in these we find that the deaths from small-pox bear, in the different quarters of the year, the following proportions to the total deaths:—

1st Quarter from	1st February	to 30th April	11·15 per cent.
2nd	"	1st May to 31st July	6·24 "
3rd	"	1st August to 31st October	1·19 "
4th	"	1st November to 31st January	1·36 "

* Transactions, Medical and Physical Society of Bombay, No. viii. p. 28.

The tables enable us to enter into still further details, and to allot the proportion of small-pox deaths to the different months of the year. Thus—still taking the average of the five years—the proportion in different months is—

January	-	-	-	4.18
February	-	-	-	11.17
March	-	-	-	20.34
April	-	-	-	24.24
May	-	-	-	17.47
June	-	-	-	11.36
July	-	-	-	4.51
August	-	-	-	2.20
September	-	-	-	1.21
October	-	-	-	.51
November	-	-	-	.90
December	-	-	-	1.84
Total				99.93

The hospital return appended to these remarks also illustrates this feature of small-pox, viz., that it prevails most in Bombay in the first half of the year, and more in March and April than in other months. The same general law is also true of Calcutta.* A similar characteristic, but much less marked, may probably be observed of small-pox epidemics as occurring in Europe. Sydenham distinctly states that the season about the vernal equinox is that most favourable to epidemic

* Report of the Small-pox Commissioners, Calcutta, 1850, table A. page 9. ; also the following abstract, taken from p. 24 of the same Report.

TABLE showing the Total Monthly Mortality by Small-pox during Eighteen successive Years, from 1st May, 1832, to 1st May, 1850, inclusive.

November	-	-	120	March	-	-	3689	July	-	-	551
December	-	-	512	April	-	-	2846	August	-	-	189
January	-	-	1316	May	-	-	1419	September	-	-	181
February	-	-	2372	June	-	-	761	October	-	-	134

small-pox; and the same fact may be traced more or less through Huxham's "Observations on Air and Epidemics." In the Second Annual Report of the Registrar-general of births, deaths, and marriages in England, there is an account of an epidemic small-pox in England in the years 1838, 1839, in which I think the law may be traced, but not so markedly as in the Bombay and Calcutta records. For example, from 1st January to 1st July of 1838, there were 8,631 deaths from small-pox; from 1st July to 1st January, 7536 deaths, being a decrease of 1095 in the last half-year. From January to July, 1839, there were 5487 deaths; but from July to January, 1840, there were 3263, being a decrease in the summer and autumn of 2224.*

The question of the degree to which the prevalence of small-pox may be attributed to the practice of inoculation, has been discussed in the Bengal Reports; but as respects the island of Bombay it need not be entertained. The practice of inoculation is not, it is believed, followed by any of the classes of the native community of Bombay. But a greater mortality from small-pox in some years than in others is very observable in Mr. Leith's Reports; for example,—

In 1848.	1849.	1850.	1851.	1852.
7·80	2·70	7·635	3·57	7·45

We gather, then, from Mr. Leith's registers, that the

* This observation, written in 1846 and published (Transactions, Medical and Physical Society of Bombay, No. viii. p. 29.) in 1847, does not altogether accord with the statement made by Mr. Bedford at page 192. of the very able and interesting paper already referred to; nor with that of the Small Pox Commissioners of Calcutta at page 24. of their Report. I have not at present the opportunity nor the time to make another and more extensive reference to the Report of the Registrar General.

mortality from small-pox in the island of Bombay is very nearly 60 in 1000.

Small-pox inoculation is not practised in the island; but it is so to some extent in the adjoining Concans. Therefore, though the native population of Bombay is not in general protected by inoculation, still, from its fluctuating character, a proportion of it probably is so.

I have not at my command any note of the number of annual vaccinations in Bombay; but I know that the proportion which they bear to the total native population is very limited indeed. The mortality from small-pox in Bombay represents that of a very partially protected community. But when we direct our attention to the pure European residents of Bombay, whose number, according to the census of 1850*, was 5088, we find that, during the five years from 1848 to 1852 inclusive, 1177 deaths are registered, and of these 12 were from small-pox. This is a fraction more than 10 deaths in 1000; double that of the average of European countries in which vaccination is *compulsory*, but not half that of England and Wales, and not more than one-fifth of that of the native population of Bombay. There can be no doubt that the instances, if any, must be few of inoculated Europeans in Bombay, and that therefore the smaller proportion of mortality from small-pox in them can only be attributed to the protective power of vaccination.

The results deducible from my notes of the fatal cases of European officers do not seem so favourable to

* I have not alluded to this census (which makes the total population of the Island 566,119), relative to the native population, because it is considered untrustworthy. But in respect to Europeans there is no reason for questioning its accuracy.

vaccination. Of 311 deaths 7 were from small-pox, which is at about the rate of 22 in 1000. Of these* 6 occurred in the years 1848, 1849, 1850, 1851. The remaining case passed under my own observation on the Mahubuleshwur Hills, in the year 1834, and the following is a note of it:—

69. *Small-pox. — Gastritis. — The Mucous Coat of the Stomach coated with Lymph.*

A gentleman aged twenty, of slight frame, who had been two years in India, and the occasional subject of dyspeptic symptoms, complained, on the 15th February 1834, of languor and nausea, and occasional sense of chilliness with furred tongue. This state continued on the 16th, and on the 17th red papulæ were observed on the hands: on the 18th the face and chest were also covered, and many of the papulæ had assumed a vesicular character; there was heat of skin, furred tongue, and occasional cough. On the 19th the eruption was more vesicular, and its nature no longer doubtful. On the 20th there was restlessness with much thirst, occasional vomiting, increase of cough, and uneasiness under the sternum; and the eruption on part of the trunk and the extremities had assumed a purplish tinge. Towards evening the irritability of stomach increased, and there was frequent vomiting of dark red grumous matter. These symptoms were unmitigated by leeches applied to the sternum, anodynes, and pills of acetate of lead and opium, &c. Death took place on the 20th at 11 P.M.

This gentleman had been twice vaccinated.

Inspection twelve hours after death. — Chest. The lungs were emphysematous, several large bullæ of air projected from their surface. Posteriorly, there was considerable congestion, and the lining membrane of the bronchial tubes was of dark red colour, as was also that of the large vessels given off from the heart.—*Abdomen.* The liver extended to the crest of the right os ilium, was pale in colour, and not congested with blood. The vessels of the mesentery, mesocolon, and omentum were congested. The stomach was much distended, and occupied a very considerable part of the cavity. It contained dark red fluid contents, tinging the inner surface, which presented a uniform

* One at each of the following stations: Seroor, Nassick, Poona, Mooltan. Of two the station is not mentioned in my notes.

granular secretion coating the entire mucous tunic; in some places so consistent as to admit of being peeled off for a short extent, in others scraping off a pulpy granular mass. The mucous coat was found underneath the secretion, of natural texture, but of dark brown red tint, with here and there an extravasated patch. Midway in the smaller curvature, there was a small loose tubercle underneath the mucous coat.

In this case the notice respecting vaccination is not precise, and, in the other cases, the subject is overlooked. When, therefore, we recollect the great extent to which vaccination has been practised since the commencement of the present century, and the undoubted fact that, throughout much of that period, the great caution and care evinced by the early vaccinators have been often lost sight of, we are not justified in considering fatal cases of small-pox, occurring after *reputed* vaccination, as instances of the disease after *successful* vaccination, unless there be greater evidence of close and careful inquiry than the records usually present.

After a careful consideration of the subject of small-pox and its prevention, as it has presented itself to me in practice and in the writings of others, I venture to express the conclusions to which I have been led.

1st. Vaccination, when properly conducted, is as powerful as small-pox inoculation in preventing or modifying small-pox, and thus lessening its mortality.

2nd. Though neither of these means is infallible, much of the disappointment which more particularly of late years has attended vaccination has resulted from carelessness and ignorance on the part of those receiving and communicating it; and much of the argument against it rests on figured statements based on loose observation and partial inquiry.

3rd. The opinion that vaccination, after a period of

years, loses its protective influence, does not rest on satisfactory evidence; but though the necessity or advantage of revaccination be unproved, the practice of so simple a proceeding need not be discouraged so long as doubt remains.

4th. Inoculation is not to be compared to vaccination as a prophylactic measure, because it is attended with some risk to life, and is a means of keeping up small-pox infection.

5th. Inoculation, if carefully conducted and with proper segregation of the affected, is better than neglect of prophylactic measures, and therefore, when existing in a country as in Bengal, should not be authoritatively interfered with till complete and efficient vaccination has been substituted.

6th. The practice of vaccination in India has hitherto been very inefficient and quite inadequate to exercise any considerable influence on the health of the natives of the country.* Its tabular records, from the impossibility—owing to the prejudices or fears of the people—of verifying the success of the operation in a large proportion of cases, and from the ignorance, dishonesty, and unskilfulness of much of the native agency employed, are quite unworthy of being received as evidence for or against a question so important as the prophylactic power of vaccination.

7th. The spread throughout India, as civil practitioners, of native medical gentlemen educated in the Indian medical colleges, and countenanced by the just support and encouragement of the government, combined with the co-operation of the educated classes, is

* I speak of the civil population. The statistics of the Native Army will, I doubt not, give ample evidence of the prophylactic power of vaccination. I have no data of this kind at my command.

the only sure means of materially improving the public health, and lessening mortality in India by vaccination and other sanitary measures.

8th. Though there are some difficulties in keeping up vaccination in the climate of India, they are easily overcome, with exception of the north-western provinces, and, it may be, one or two other districts; but in these the intermission of vaccination during the months when the vaccine cannot be propagated, is not a practical evil, because in those months, in such districts, small-pox is probably unknown.*

* In 1846 (Transactions, Bombay Medical Society, No. viii. p. 29.), adverting to the facts stated in a former page, which seem to show that the prevalence of small-pox, in particular seasons so remarkable in India, may also be traced in European countries, I remarked, "Though, then, this law of epidemic small-pox is not peculiar but only more marked in tropical countries, it is only, as far as I am aware, in this country, that a similar law has been observed in a remarkable way to influence the propagation of the vaccine disease.

"Now that there is not any longer doubt in regard to the identity of small-pox and cow pox, the difficulty of propagating the latter in some parts of India during the hot months may be considered as in accordance with the epidemic law, and as additional evidence of the identity of the two diseases. The difficulty which has attended the propagation of the vaccine disease in some months, in some of the Bengal provinces, has been the subject of much discussion, and too much weight has in all probability been attached to it, as an *impediment* in the way of the diffusion of the protective influence of vaccination in India. While the law of preference of certain seasons has been so much dwelt on with reference to the cow pox, it has been too much lost sight of in regard to the small-pox. For what is the practical inference? It is this: if, in the seasons in which there is difficulty, if not impracticability, in propagating the vaccine disease in its perfect form, there is also very seldom prevalence of epidemic small-pox—does it not follow that this obstacle to the diffusion of the vaccine is a matter of no great regret, and speaking generally, the absence of vaccination in these seasons no great evil, because there is no great demand for the exercise of its protective influence? While

9th. Those engaged in vaccination in India should bear distinctly in mind the conditions necessary to ensure its protective influence. These are well stated in the following words of the Bengal Small-pox Commissioners *:—

“ *First*, it may be set down as an axiom never to be forgotten, that the vaccine vesicle, to be successful and perfect, must undergo a regular and definite course; and that no one is qualified to judge of its effective character, or to certify to its authenticity or success, who is not familiar with its correct appearance at different stages, and has not noted its progress at suitable periods.

“ A *second* point demanding unvarying assiduity is the character of the lymph employed. It never ought to be taken from a vesicle that deviates in the least degree from the perfect standard; nor from a patient labouring under any cutaneous disease; and it ought never to be applied to an individual who is, at the time, either suffering under any illness, or exposed to any infectious disorder.

“ Knowing as we do the universality of skin disease among the natives of Bengal, we fear this rule has not always been carefully attended to by the native vaccinators, and that deviations have thus arisen and been propagated, which afforded varying degrees of security according as they approached to or receded from the healthy character. The genuine disease can only be produced by pure lymph from a pure and regular source, and the proper time for obtaining this lymph from the vesicle is between the fifth and eighth day.

“ A *third* point, which we have reason to suspect is too often overlooked, is the necessity of leaving one or more of the vesicles

on the contrary, if the seasons, to which epidemic small-pox is almost exclusively confined, are those, or immediately succeed those, in which there is no difficulty in keeping up the vaccine disease,—then, does it not follow that vaccination, assiduously and carefully practised in those seasons, will afford to the people almost the full measure of its protection?”

Mr. Bedford, at page 194. of his “Notes,” shows, that in the Upper Provinces of India, successful vaccinations in July amount only to 10 per cent., and in October to 7 per cent.

* P. 48. of their Report.

to run their normal course without being in any way disturbed. We believe that this caution has been often neglected, by reason of the carelessness and ignorance of parents, and the too hurried manner in which vaccination is sometimes performed and conducted.

“A *fourth* point, on which perhaps too much stress has been laid, is the appearance of the cicatrix or *mark* which is left on the arm. It is true that after regular vaccination it generally assumes an uniformity of aspect well known to medical men, and on its appearance the medical officers of H. M. Army and Navy mainly depend, and all recruits in whom it is not perfect are subjected to vaccination. We are, however, satisfied that *by itself* it ought never to be absolutely trusted to as a proof of previously successful vaccination. It is only when unceasing attention is paid to every one of these, the fundamental Jennerian principles of vaccination, in each individual case of transmission, that it is possible to preserve the vaccine lymph from deterioration; for if a deviation once commences it must be perpetuated and must necessarily afford a gradually decreasing protection.

“A fifth point essential to the practical success of vaccination in India, but which is not noticed in Europe, is the selection of the proper season of the year for its performance. It has been long observed that extreme heat of the weather proves antagonistic to the successful propagation of the vaccine prophylactic, as it has been shown to be to small-pox. The latter disease, we know, invariably begins to decline in April, and all the vaccine returns from Bengal and the Upper Provinces of India indicate a corresponding decrease in number and in success at that season; it must be inferred that there is a diminution in its efficacy as a preventive.

“So remarkable has this occurrence in the Upper Provinces become of late years, that the Medical Board submitted, not long ago, to Government a recommendation that vaccination should be entirely suspended there during the hot months on this account.”

10th. There is no sufficient evidence to show that Europeans in India, whether vaccinated there or in Europe, are less protected than if they had continued to reside in the latter country.

11th. In respect to many of the cases of fatal small-pox in Europeans in India and elsewhere, there is a

want of sufficiently precise information in regard to the character of the asserted vaccination.

12th. The opinion entertained by Dr. Mackinnon, that the natives of India receive small-pox in a milder form than those of other countries, is not supported by hospital returns or clinical experience.

Since these observations on vaccination were written, I have been gratified by learning that Dr. C. Coles, the present able and indefatigable Secretary of the Bombay Medical Board, has called the attention of the Medical and Physical Society to the "Rise and Progress of Vaccination in Western India;" and the merits of Dr. de Carro, by whose exertions vaccine lymph, obtained from the dairies in Lombardy, was first transmitted to India.

A narrative of this kind seems to me chiefly important, because it serves to show the contrast between the zealous efforts of the early vaccinators, who, warmed by the genius and philanthropy of Jenner, were worthy to follow in his steps; and the apathy of that after-generation whose coldness and indifference have for a season tarnished the fame of the greatest glory of medical science.

TABLE XVIII.—*Tabular Statement of the Admissions and Deaths from Small-pox, in the Jamssetjee Jejeebhoy Hospital at Bombay, for the Six Years from 1848 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1848.		1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths on Admissions.	Deaths on Total Admissions.	Total Deaths.
January -	5	-	1	1	9	4	6	2	3	2	8	-	32	9	28.1	1.5	2.0
February -	22	6	8	-	14	3	4	4	8	1	3	4	59	18	30.5	3.1	5.6
March -	20	9	6	1	21	8	6	3	13	5	8	3	74	29	38.8	3.4	7.5
April -	5	6	4	2	10	3	2	2	14	9	17	6	52	28	53.8	2.4	8.1
May -	4	1	3	1	6	4	1	1	3	3	-	1	17	11	64.6	0.7	3.8
June -	2	-	1	-	1	1	2	1	-	-	2	1	6	1	16.6	0.2	0.3
July -	1	1	2	1	2	1	2	1	3	1	-	-	10	3	30.0	0.5	0.9
August -	-	-	2	-	-	-	-	-	-	-	-	-	2	3	15.0	0.1	0.8
September -	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.05	-
October -	1	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
November -	1	-	3	1	-	-	2	-	-	-	-	-	7	1	100.0	0.05	0.3
December -	1	-	-	-	-	-	-	-	1	-	-	-	7	1	14.3	0.3	0.3
Total -	61	24	30	7	63	23	23	13	46	21	38	16	261	104	39.8	1.03	2.5
Deaths per cent. of annual admissions -	39.3		23.3		36.5		56.5		45.6		42.1						
Admissions per cent. of total annual admissions -	1.7		0.7		1.3		0.5		1.1		0.9						
Deaths per cent. of total annual deaths -	4.3		1.01		2.9		1.8		3.2		2.4						

MEASLES.

SECTION II.

THE CLINICAL HISTORY OF MEASLES AS OCCURRING IN THE BYCULLA SCHOOLS IN BOMBAY.

MY clinical knowledge of measles has been obtained chiefly in the sick wards of the Central Schools at Byculla.* This Institution is for the maintenance and education of children of the European soldiers of the Bombay Presidency. The children are partly of unmixed European extraction, and partly Indo-Britons. During the last fifteen years, their numbers—both sexes included—have ranged from 235 to 355, and their ages from 3 to 16.

There are two buildings, one for boys, the other for girls; they are situated in the same grounds, with an interval of about 100 yards between them. About four years ago, a separate building for an hospital was added to the Institution. Before this period the sick wards were in the school buildings.

Measles prevailed in this school in October, 1832†, but no record has been preserved of this visitation. The next occurrence of the disease was in December, 1838; it commenced on the 21st of that month, and continued till the 2nd of April, 1839. At this time I held medical charge of the Institution.

The schools, with the exception of a single case in

* In the Island of Bombay.

† Measles was very prevalent at Calcutta and the vicinity, in March, April, and May, 1832, as stated by Mr. Corbyn. Transactions, Medical and Physical Society of Calcutta, vol. vi. p. 477.

January, 1840, remained free of measles till December, 1846, when it commenced on the 21st of the month and ceased on the 10th March, 1847. Again the disease disappeared till the 13th March, 1852, when it set in and prevailed till the 22nd of May. I shall take no further notice of the visitation of 1832, and in the subsequent remarks I shall designate the remaining three, the first, second, and third epidemics.

In all of these the disease commenced in the girls' school, but in the second and third epidemics, the importation of the infection was traced to a fresh arrival. In the three epidemics very nearly the same period elapsed between the commencement of the disease in the girls' school and its appearance in the boys' school. In the first epidemic it was twenty-six days, in the second, twenty-seven, and in the third twenty-four days. During the first and second epidemics there was no separate hospital building. During the first epidemic the healthy children were removed to a building at some distance*, and the school-rooms were converted into sick wards. This course was adopted because, in the months of February and March, 1837, 74 cases of mumps occurred in the girls' school, but not a single case in the boys' school; and in the months of March and April, 1838, 29 cases of varicella occurred in the boys' school, but not a single case in the girls' school. I had therefore, on the outbreak of measles in the girls' school, some expectation that it would not extend to the boys' school, and in consequence did not recommend in the first instance any measures of prevention in addition to those already afforded by the school buildings.

But the removal of the healthy children, after the

* The imperfect accommodation for the sick was also a reason for the adoption of this measure.

disease had shown itself also in the boys' school, had no effect in checking the further spread of the epidemic.

There have been then, in the course of twenty years, four visitations of measles in these schools, with intervals of five and eight years. The three last occurred in the first five months of the year. Epidemic measles then, in Bombay, shows a preference for the same months as small-pox, and (as has just been shown), mumps and varicella are similarly characterized.

The following is a note of the admissions and deaths of the three epidemics.

	Admissions.	Deaths.	Mortality per cent.
1838-39	100	5	5.
1846-47	144	5	3.4
1852	107	„*	5.4

These three epidemics have been described in the Transactions of the Medical and Physical Society of Bombay. The first† by myself, the second‡ by Dr. Coles, and the third§ by Mr. Carter.

I shall avail myself freely of these records, and state the facts in detail, because all faithful observation relative to epidemic diseases is of importance more particularly in India, where the subject as yet has not received sufficient consideration. I commence with my own report of the first epidemic.

During the months of September, October, and November, 1837, catarrhal affections were more or less prevalent in the Schools, but in few instances required more care than a stricter attention to clothing.

Girls' School.—On the 21st December a girl, without any initiatory fever, became affected with an eruption

* The number is not distinctly stated in the Report.

† 2nd No.

‡ 9th No.

§ 1st No., New Series.

resembling in several particulars that of measles. Though neither catarrhal symptoms nor tender eyes were present, this girl, as a precautionary measure, was sent to the General Hospital.

Before her return to the schools on the 28th December, another girl became affected with the symptoms characteristic of measles. On the 30th a second case occurred; on the 31st, eight cases; on the 1st January, four; on the 2nd, three; on the 4th, two. No further cases took place till the 9th January, when there was one; on the 10th, three; on the 11th, three; on the 12th, two; on the 19th, one; on the 24th, one. There were now no fresh cases till the month of February, when, on the 4th, there occurred one; on the 16th, one; on the 25th, one; on the 28th, two. There were no further cases till the 2nd of March, when there was one; on the 9th, one; on the 10th, three; on the 11th, two; on the 22nd, two; on the 26th, one; on the 27th, one; and on the 29th, one. The last case occurred on the 2nd of April.

Boys' School. The disease, which had commenced in the girls' school on the 21st of December, and which, before the middle of the month of January, had affected thirty-three individuals, and proved fatal in four instances, did not make its appearance in the boys' school (though the buildings are adjacent) till the 15th January, when one case occurred.

It was now considered prudent to adopt measures, with the hope of checking the progress of an epidemic which had already shown itself under a severe form. Accordingly, the *healthy* children of both schools were removed from the infected buildings to a bungalow about half a mile distant.

No further case occurred amongst the boys till the

21st of January, when another boy became affected, and was immediately removed from the bungalow to the school-building. On the 23rd two cases occurred; on the 24th, three; on the 25th, ten; on the 26th, two; on the 27th, three; on the 28th, one; on the 30th, one. On the 1st of February there were two cases; on the 2nd, one; on the 3rd, three; on the 5th, two; on the 6th, one; on the 24th, one. On the 1st of March one case; on the 7th, one; on the 12th, two; on the 21st, one; and on the 22nd the last case was admitted.

In the month of February, during which there were comparatively few cases of the disease, the school-buildings were cleansed and whitewashed, and the children returned to them on the 17th of that month.

Statement of the Monthly Admissions from Measles.

			Girls.	Boys.
December	-	-	11	0
January	-	-	22	24
February	-	-	5	10
March	-	-	12	6
April	-	-	1	0
Total	-	-	51	40

Amongst the girls there were four fatal cases, three of which were taken ill on the 31st of December, and one on the 1st January. Amongst the boys there was one fatal case, taken ill on the 6th of February. Besides the cases noted in the table*, there were about ten others, the children of matrons or other persons connected with the establishment; giving a total of about 100 cases treated and five deaths.

Amongst the girls initiatory fever was seldom observed. The first signs noted were the eruption, tender eyes, and slight catarrh. Amongst the boys initiatory

* Appended to these remarks.

fever was more frequently marked; but this might in some degree, perhaps, be owing to the circumstance, that amongst them the disease was expected, and its first approaches more carefully watched for. Amongst the girls porriginous affections of the scalp and other cutaneous eruptions were not uncommon after recovery. Amongst the boys there was a catarrhal ophthalmia epidemic at the same time. It affected many of the boys during the progress of the measles, almost all during convalescence or after recovery. This epidemic ophthalmia, however, was by no means confined to those boys who had suffered from measles. It affected many others also, and still continues (29th April) prevalent.

The unfavourable symptoms generally presented themselves on the decline of the eruption, but not, I think, more frequently in cases in which the eruption had been faint throughout, than in those in which it had been abundant and vivid. These symptoms depended in every instance on affection of the lungs (pneumonia, bronchitis, and emphysema), and were in most cases detected before the positive indications of cough, hurried respiration, or uneasiness of the chest were present. The face became flushed, the skin dry, the pulse somewhat excited, and a careful stethoscopic examination generally detected, in some part of the chest, a faint crepitation mixing with the respiratory murmur. In several cases, and these the most precarious, there was a complication of gastro-enteric irritation or inflammation marked by a florid tongue, occasional diarrhoea, debility, and rapid feeble pulse. This complication of pneumonia and gastro-enteritis, at all times unfortunate, was markedly so in that cachectic state of constitution too characteristic of some of the children in these schools. In two of the fatal cases the mucous lining of the mouth and gums was

ulcerated and gangrenous ; and in some of the favourable cases a minor degree of the same state was present.

Treatment. — In the majority of cases nothing was required but confinement to bed in a well-ventilated room, low diet, prevention of chilling of the surface by suitable clothing, and, if the bowels were confined, the exhibition of a mild laxative. In some cases the tongue was more than usually coated ; and when, at the same time, there was no evidence of gastro-enteric irritation, it was of advantage to precede the laxative with a small dose of a mild mercurial. In this, as in all epidemics of measles, it was very necessary to watch carefully for the first symptoms of a commencing pneumonia, or of an aggravation of the bronchitis. In no case of this epidemic was venesection justifiable under these circumstances ; for the state of constitution of the children of these schools is not such as is suitable for this antiphlogistic means. Much benefit was derived from the application of leeches in numbers appropriate to the particular case. Tartar emetic in small doses frequently repeated was also very beneficial in some cases ; but the free use of this remedy was generally contraindicated from the tendency to gastro-enteric irritation, which was so frequently observed. It was of advantage, after the stage for leeching had passed, to apply a small blister* over the most affected part of the lung.

But the cases in which the pulmonic inflammation was complicated with gastro-enteric irritation required much

* I generally used the liquor lyttæ. Though no bad effects resulted in any of the cases of measles, there was one unfortunate case before the commencement of the epidemic. In an Indo-Briton of cachectic constitution, a blister applied behind the ear, for an ulcer of the cornea, remained long discharging and became gangrenous as the cachexy increased.

care. They generally occurred in subjects of asthenic constitution, in whom free leeching was inadmissible, and in whom the use of tartar emetic, mercurials, and purgatives was also contra-indicated. These occurrences could only be met by very cautious leeching and blistering, and the use of ipecacuanha in moderate doses; and by warding off, as far as practicable, an increase of the asthenic state by the use of nutriment adapted in quantity and quality to the condition of the gastro-intestinal lining.

It is of very great importance in the treatment of measles in the asthenic children of India, to be very careful not to carry depletory treatment too far; to watch for a failing pulse and other symptoms of asthenia, and then to give chicken broth or beef tea, to substitute squills and carbonate of ammonia with camphor mixture, for antimony, and to use wine if necessary.

I am satisfied that several lives were saved in this epidemic from observance of these principles, and that the errors of treatment were on the side of too much depletion.

I shall now quote ten recovered cases of measles with the view of showing the course which the disease pursues in India. In the two first the progress was favourable. In the two next pneumonia, or aggravation of bronchitis, coexisted with a vivid state of the eruption. In the remaining six pneumonia, or aggravation of the bronchitis, came on with recurrence of pyrexia as the eruption was fading.

70. *Measles pursuing its Course favourably.*

James Hewitt, ten years of age, of European parents. Tender eyes and slight febrile symptoms were first noted on the 22nd January. On the 26th the eruption of measles was present in detached patches on the face and chest. There was

ringing cough on full inspiration. Tongue florid. On the 27th he inspired freely; the cough was loose; there was no fever. The eruption fainter on the face and chest, was also present in patches on the extremities. On the 28th the eruption was gone. He was discharged well on the 8th February. Some leeches were applied to the sternum on the 26th; an aperient was also given, and the lunar caustic solution was used for ophthalmia, present in slight degree during convalescence.

71. *Measles.—Initiatory Fever.—Paroxysmal and without Catarrh.—Progress favourable.*

Robert Smith, aged ten, an Indo-Briton, after having been affected for some days with paroxysms of fever, having distinct intermissions and unattended by catarrh or tender eyes; the eruption of measles appeared on the 3rd February, and on the 4th was vivid and coalescing on the face and trunk; tongue dotted red; eyes tender; respiration somewhat oppressed; and cough excited by full inspiration; pulse full. Is of stout habit and has had aperient medicine several times. Apply twelve leeches to the sternum and use a foot-bath at bed-time: conjee diet. 5th. Eruption fainter; respiration freer; no fever; tongue clean; bowels slow. An aperient was given the following morning. 6th. Bowels open; eyes tender; cough slight. 9th. Use the five-grain lunar caustic solution for the eyes. 14th. Discharged well.

72. *Measles.—Slight Pneumonia of both Lungs when the Eruption was distinct.*

John Mathews, eight years of age, of European parents, was admitted into the sick ward on the 21st January, 1839, affected with febrile symptoms. On the 22nd there was the commencing eruption of measles on the face and chest, attended with slight cough. On the 23rd the eruption was more copious on the face and chest, the eyes were tender and watery, the tongue and lips florid, pyrexia moderate, the bowels open. Full inspiration excited cough. On the 24th the eruption, copious and vivid on the face and chest, was absent on the legs. There had been hard cough with oppressed breathing during the night, and at the posterior part of left side of chest crepitus was detected. The pulse was of good strength; the tongue was coated yellow in the centre and was florid at the tip. The bowels were open. He had taken five quarter-grain doses of tartar emetic, and had vomited five times. Twelve leeches were now

directed to be applied to the sternum, the antimonial mixture to be continued, and grains three of calomel, quarter of a grain of tartar emetic, and half a grain of opium to be given at bedtime. The breathing and cough were much relieved by the leeches, and he passed a good night. On the 25th the eruption was still vivid on the trunk; occasional crepitus in both dorsal regions, and occasional sibilus elsewhere, but otherwise the chest was clear. The tongue florid but less coated. There was less heat of skin. The pulse was 120 and feeble. Four doses of the antimonial had been taken. The medicine was omitted, but at the evening visit six additional leeches were applied, and the calomel repeated in combination with Dover's powder. He passed a good night, and on the 26th the eruption was still vivid on face and trunk, but there was none on the extremities. Crepitus continued audible in the lower dorsal regions. There was very little heat of skin. Small blisters were applied to the chest, but did not rise well. On the 27th the skin was cool, the breathing calm; cough loose and less frequent; the eruption faint. After the 30th he was convalescent, but he continued delicate for some time and subject to slight attacks of diarrhœa.

73. *Measles.—Vivid Eruption.—Considerable Tracheal Irritation.*

Henry Mathews, six years of age, of European parents, was admitted into the sickward on the 24th January, with slight fever, cough, tender eyes, and a few spots on the face and chest. On the 26th eruption vivid, with coalescing patches on the face and chest. Catarrh and pyrexia slight. Bowels open. On the 27th the face and trunk were vividly red with only a few intervening patches of unaffected skin. On the extremities the patches were large, coalescing, and vivid. There was dry ringing tracheal cough; tongue florid at the tip, pulse frequent and skin hot; bowels free, no vomiting. Ten leeches were directed to the sternum, and tartar emetic in eighth of a grain doses every four hours. On the 28th the eruption was still vivid, but not so uniform on the trunk, and presenting more the character of coalesced patches. The cough still frequent, ringing, and causing uneasiness at the top of the sternum. Skin hot and dry; pulse frequent and well developed; tongue florid at the tip with a broken crust in the centre. No anxiety of countenance. Ten leeches were repeated, and three grains of calomel, with half a grain of ipecacuanha, were given at bed-

time. On the 29th the eruption was still distinct all over the body; cough ringing and tracheal, but skin and pulse were soft. The antimonial was continued every third hour. On the 30th the eruption was fainter but still distinct; cough less. On the 31st, the eruption still distinct on the extremities and visible on the trunk. After this, convalescence, but with tender eyes for some days. He was discharged on the 6th February.

74. *Measles with faint Eruption.—Extensive Capillary Bronchitis.*

James Burke, seventeen years of age, of European parents, was admitted into the sick-ward on the 12th March. On the 13th the eruption had appeared on the face, and there was considerable cough. Eight leeches were applied to the sternum, and the sixth of a grain of tartar emetic was given every fourth hour. On the 14th the eruption was copious but faint, the voice hoarse, he did not cough much, but the breathing was oppressed and hurried, and he complained of a sense of choking. There was crepitus in the right mammary region. Pulse 120, of moderate firmness. He dosed much. An emetic of ipecacuanha and tartarized antimony was given and twenty-four leeches were applied to the sternum. At the evening visit the breathing was freer, the skin hot, pulse 120, of good strength. Twenty-four leeches were repeated, and four grains of calomel with quarter of a grain of tartar emetic, and two grains of Dover's powder were given at bed-time. He passed a pretty good night, and on the 15th was more lively. The respiration was still hurried, and there was cough with mucous expectoration; general rhonchi,—sonorous, sibilous, sub-crepitous, almost crepitous in character—posteriorly. Pulse 104, feeble, soft; eruption nearly gone. A blister was applied to the chest, and a sixth of a grain of tartar emetic ordered every second hour, and the calomel, antimony, and Dover's powder repeated at bed-time. The blister rose well and there was improvement in the pulmonic symptoms on the 16th, with, however, an aggravation towards evening, when twelve more leeches were applied. On the 18th, squills were added to the antimonial mixture. He slowly convalesced, and was discharged on the 6th April.

75. *Measles.—Suspected Pneumonia coming on as the Eruption faded.—Saved by Intermission of Depressant Treatment.*

Peter Davis, five years of age, of European parents, was

admitted into the sick ward on the 22nd January, with slight febrile symptoms. On the 23rd there were a few papulæ on the face and chest with moderate catarrh and tender eyes, and clean tongue. On the 26th the eruption was scanty and papular on face and chest; no fever, moderate catarrh, tender eyes, tongue clean but florid at the tip. On the 27th there was slight pyrexia, with the eruption on the face and trunk very vivid and in coalesced patches. It was distinct at the extremities, but not so vivid and copious; catarrh moderate; tongue coated. He was ordered three grains of calomel and antimonial powder at bed-time, and some castor oil the following morning. On the 28th the eruption was still distinct, but not so vivid; no fever; cough more frequent. He passed a restless night with moaning and febrile heat. The respiration on the 29th was hurried and abdominal, the face flushed, the skin dry, the pulse oppressed and feeble, tongue florid; and the eruption still out on the extremities. In the lower lateral and dorsal regions of both sides, the respiration was somewhat bronchial in character, but no crepitus was detected. Six leeches to the sternum; small blisters to the lateral regions; sixth of a grain of tartar emetic every third hour; calomel three grains, ipecacuanha half a grain, at bed-time. On the 30th pyrexia, hurried breathing with dryness of the tongue in the centre, but less cough. On the 31st, pulse frequent, small, still heat of skin, hurried breathing and moaning. He asked for chicken broth, which was given him, and all medicine omitted. He now gradually improved in all respects, and was discharged on the 11th February. He was readmitted on the 26th February, ill with diarrhoea attended with florid tongue. He continued in a precarious state for some time, but subsequently recovered.

76. *Measles.*—*Pneumonia after the Eruption had disappeared.*

Susanah Brown, seven years of age, a healthy child of European parents, was admitted into the sick ward on the 31st December, 1838, affected with slight catarrh and watery eyes. On the following day the eruption of measles appeared. On the 2nd January it was copious on the face and chest, and commencing on the extremities. There was a hard cough. A mild antimonial, with acetate of ammonia, was given. On the 3rd the eruption was fainter on the face and chest, and more vivid on the arms and legs; there was no fever, but the tongue was slightly furred in the centre and red at the edges. Bowels open. No medicine was given. On the 4th the eruption was fainter on the arms and legs, and on the 5th the cuticle was

desquamating from the face. On the 6th the eruption was still visible on the arms. On the 7th recurrence of pyrexia, increase of cough, crepitus in the right side of chest. Ten leeches were applied to the top of the sternum and antimonial solution given every second hour. On the 8th no heat of skin. Sibilus mixed with the occasional faint crepitus. A small blister was applied. On the 9th breathing improved. From this time, under the use of ipecacuanha, combined with small doses of calomel, she improved, and was discharged well on the 13th.

77. *Measles. — Bronchitis with a fading Eruption, saved by Stimulants and Nourishment.*

Mary Buxy, eleven years of age, an Indo-Briton of delicate constitution, was admitted into the sick ward on the 2nd of April, with the eruption of measles on the face and chest, with febrile symptoms, moderate catarrh, and furred tongue. Calomel and a purgative were given, but the former was not repeated, as the gums presented a dark red and spongy appearance. On the 4th the eruption had faded considerably, but there was oppression of the chest and inability to take a full inspiration. The skin hot; the pulse frequent. Eighteen leeches were applied to the chest, and the antimonial solution was continued. She passed a restless night, and on the 5th the breathing was oppressed and wheezing, and there was tendency to drowsiness. The surface of the trunk had a purplish tint. Pulse 104, of good strength; bowels not moved. An emetic of ipecacuanha and tartarized antimony was given and a blister was applied to the chest. The emetic did not act, and was repeated at the evening visit again without effect. She had been moaning all day; the breathing was oppressed; the cough not frequent, but when she coughed the bowels were moved involuntarily. Pulse frequent, of moderate strength. She was drowsy and her eyes suffused. The head was shaved, a blister was applied to the nucha and sinapisms to the feet. The blisters rose well, and on the 6th the drowsiness was less and the breathing not quite so laboured. Skin cool, pulse 120, compressible; tongue coated. Two grains of calomel with six of rhubarb were given. The sinapisms were repeated to the feet, and wine given with her arrow-root; and some camphor mixture with acetum scillæ every four hours. On the 7th there was less drowsiness and oppression of breathing, the pulse was 104 and of better strength, and the skin was soft. The squills, wine, and arrow-root were continued. On the 8th, carbonate of ammonia was given, the wine and

arrow-root continued, and chicken broth added. She now improved slowly, and was well on the 20th.

This case was saved by stimulants and nourishment, but the depressants were too long continued, and the nourishment not given sufficiently soon or freely.

78. *Measles. — Exacerbation of Pulmonic Symptoms at the period when the Eruption began to fade.*

Isabella Gray, seven years of age, of European parents, and generally healthy, though occasionally the subject of cutaneous affections, was admitted into the sick ward on the 12th January. The eruption on the face, neck, and arms was profuse; there was slight catarrh, slight heat of skin, and watery eyes, and the bowels were open from medicine. At the evening visit the skin was hot and dry, pulse quick and sharp, cough frequent and hacking; two grains of calomel with six of jalap were given. On the 13th the eruption was very vivid on the face, which was greatly swollen. The eyes vascular; pulse full; tongue coated. On the 14th pyrexia continued. On the 15th the eruption was still copious, but less vivid. The skin hot; pulse frequent; breathing oppressed, but no rhonchi audible on the anterior part of the chest. She was feverish during the night, and on the 16th pyrexia continued; pulse 120. The breathing oppressed, cough dry and frequent, but still no rhonchi audible on the anterior part of the chest. The eruption was still distinct on the chest, but desquamating on the face. Six leeches were applied to the top of the sternum, and the sixth of a grain of tartar emetic given every third hour. On the 17th less pyrexia, and the breathing was easier and the cough looser. On the 18th there was again exacerbation of symptoms, and the antimony which had been omitted was resumed, and two grains of calomel with ipecacuanha and Dover's powder were given at bed-time. She now gradually improved, and was discharged on the 31st.

79: *Measles. — Faint Eruption. — Pneumonia after it had faded.*

Sarah Duff, of seven years of age, an Indo-Briton of feeble conformation and frequently the subject of porriginous affections of the scalp, was admitted into the sick ward on the 31st December, 1838, affected with slight catarrh, mild febrile symptoms, and tender eyes. On the 1st January, the eruption of measles began to appear on the face and chest. On the 2nd it

was scanty on the face and neck, but had not appeared on the extremities. Catarrhal symptoms were moderate. On the 3rd the eruption was nearly gone, and there was very little cough. On the 5th there was slight heat of skin, and it continued with, on the 7th, increase of cough and crepitus on both sides of the chest anteriorly. A blister was applied to the chest, and one grain of calomel, quarter of a grain of tartarized antimony, and half a grain of Dover's powder were ordered every third hour. The powders were rejected. The antimony was omitted and ipecacuanha substituted, but they were still rejected. On the 8th the skin was cool. On the 10th there was still cough, but the rhonchi had disappeared. She was discharged well on the 19th.

I shall now cite the five fatal cases of the first epidemic, omitting, for the most part, the record of the treatment, for this has already been sufficiently illustrated. In all the cases there was pneumonia, which, in four, had passed on to hepatization; in one to gangrene; in two the pneumonia was general; in two lobular; in one vesicular. In all there had been muc-enteritis.

80. *Pneumonia after the Subsidence of the Eruption. — Extensive Induration of both Lungs. — Granular Exudation on the Mucous Coat of the large Intestines. — The Mucous Follicles were also enlarged.*

Margaret Harrigan, aged five, born of European parents, entered the Byculla schools in June 1837, and was frequently under treatment for porrigo of the scalp under a mild form. She was admitted into the sick-ward on the 31st of December, 1838, with febrile and catarrhal symptoms, and the commencing eruption of measles. On the 1st of January the eruption progressed favourably, and the febrile symptoms were mild. On the 2nd, the eruption was full, and the catarrhal symptoms were more severe. On the 3rd, the eruption and catarrhal symptoms were declining. On the 5th, they were both nearly gone. On the 6th, the eruption was gone, but the face was flushed, the skin was hot; the respiration was hurried and the cough had increased; the respiratory murmur, both anteriorly and

posteriorly on both sides, was mixed with subcrepitous rhonchus; the bowels were open; the tongue not florid. On the 7th, the skin continued hot and the respiration hurried; the rhonchus continued on both sides anteriorly, and was crepitous on the left side; pulse 120, of good strength. At noon pulse 112 and softer; respiration continued hurried, and wheezing. On the 8th there was less oppression of the breathing; the skin was less hot, but continued dry; the pulse was 112, of good strength; there was no floridity of the tongue. At noon there was less frequency of pulse, and two evacuations of vitiated appearance had been passed. Towards evening the skin became hotter, and the respiration more oppressed. On the 9th, pulse 80, firm and irritable; skin dry; there was crepitus under the right clavicle and on the right side; the left side was not examined on account of the blister. On the 10th at 7 A.M. the pulse was 80, irritable; skin dry; and there was frequent short dry cough and subcrepitous rhonchus general, chiefly on the lateral part of the right side. She was now transferred from the school to the General Hospital. It would be tedious to follow the detail of the symptoms, and the unsuccessful treatment pursued. The breathing continued oppressed; the pulse frequent and feeble; and on the 14th there was tendency to drowsiness, which continued but did not pass into complete coma. The bowels were occasionally relaxed, and the dejections were green and vitiated, and on the 16th dark sloughy ulcerations were discovered, of the gums and mucous lining of the cheek where opposed to the molar teeth. She died on the 17th at noon.

The treatment consisted of the application of leeches and a blister, the use of small doses of calomel, with tartarized antimony and Dover's powder frequently repeated.

Inspection four hours after death.—*Head.* Three ounces of serum in the cavity; of that, about four drachms in the ventricles; the rest at the base of the skull.—*Chest.* There were no costal adhesions, but the different lobes of the lungs adhered to each other. Of both lungs, the anterior portion of the upper lobe was white and emphysematous. The posterior part of both upper lobes, and the greater portion, but chiefly the posterior of the lower lobes of both sides, were indurated and presented, when incised, a buff-coloured surface, more or less mottled with red. The texture was quite hard and did not break down under firm pressure with the finger, nor did it in any place present a decided tubercular form. There was sero-purulent fluid in the bronchial tubes, but not much redness of their lining

membrane. The parenchyma here and there surrounding the hepatized portions, was emphysematous. The bronchial glands were enlarged.—*Abdomen.* The stomach was healthy and also the liver. The small intestines were healthy to within a few inches of the end of the ileum, where there was slight roughening of the mucous surface. In the ascending and transverse colon the follicles were enlarged; and there were patches of white granular flakes not firmly adherent to the mucous coat. In the sigmoid flexure of the colon and the rectum, the whole surface of the mucous coat was covered with granular lymph; in the rectum the layer was thickest and adhered so firmly as not to admit of separation; the mucous coat underneath, as well as the subcellular tissue, was considerably thickened. The kidneys were healthy.

81. *Pneumonia coming on after the Subsidence of the Eruption, and terminating in Gangrene. — The Inner Surface of the End of the Ileum and much of the Colon was coated with Granular Exudation.*

Eliza George, aged seven, a girl of the Byculla schools; an Indo-Britain, of dark complexion, delicate conformation, and frequently under treatment for porrigo of the scalp, was admitted into the sick ward on the 1st January, 1839, with mild catarrhal symptoms and the commencing eruption of measles. The disease progressed mildly, and on the 5th, the eruption was gone but there remained a slight cough. On the 7th, the skin was above the natural temperature, and the respiration was hurried, with mucous rhonchus on the right side. The bowels were confined. On the morning of the 8th, she was better, with a soft pulse and cool skin; at noon the respiration was more hurried, and there was admixture of crepitus on both sides, but chiefly on the lateral part of the right side. At 8 P.M. the skin was hot; pulse 120, jerking; respiration hurried. The tongue was pretty clean; the bowels had been moved once. On the morning of the 9th, there was remission of the urgent symptoms, and the skin was cool, but the leeches were repeated to the sternum; at 8 P.M. the skin was again hot, and the pulse 120. On the 10th, subcrepitous rhonchus was general over the anterior part of the chest; pulse 104; bowels opened; tongue pretty clean.

She was now transferred to the General Hospital. The respiration continued hurried; the pulse rapid; there was generally a morning remission, and an evening exacerbation;

the bowels were sometimes relaxed, the dejections being green and vitiated. On the 14th there was slight delirium; on the 15th drowsiness persisting but not passing into complete coma. On the 16th gangrenous and extensive ulceration of the gums was observed. She died on the morning of the 17th.

Treated at the commencement of the pneumonic symptoms with leeches, a blister, small doses of calomel with ipecacuanha.

Inspection five hours after death. — *Head.* About two ounces of serum in the cavity, and chiefly effused at the base; the substance of the brain was firm. — *Chest.* No costal adhesions. The different lobes of the right lung adhered to each other. The anterior part of the upper lobe was emphysematous, and of white colour; at the apex there was a portion the size of a pigeon's egg in a state of dark red hepatization, with, in its centre, a dark grey gangrenous excavation the size of an almond and exhaling gangrenous fœtor. Much of the lowest lobe of the right lung was in a similar state of hepatization, and also presented gangrenous excavations, irregular in shape, and of different sizes; in some places, the colour of the hepatized portions passed into a dark leaden grey, and this seemed to be the condition which immediately preceded the gangrene. The upper lobe of the left lung was white and emphysematous; the lower hepatized in parts with gangrene portions, as in the right lung, but to less extent. The lining membrane of the bronchial tubes of both lungs was of dark red colour, and much sero-purulent fluid oozed from those parts of the lungs which were not emphysematous. — *Abdomen.* The stomach was healthy and also the liver. The small intestines were clogged with white mucus, but their coats were healthy to within two feet of the end of the ileum, where the lining membrane was covered with granular flakes of lymph, in some places giving the roughened appearance of shagreen, in others, where the effusion had proceeded to a greater extent, it resembled the thick grey sordes frequently seen on the tongue, and completely coated the mucous surface. This lymph adhered firmly to the mucous coat, and where it was thickest, there was much redness, and firmness of the tunic itself, with so firm an adherence to the subcellular tissue that it did not move freely, as in the natural condition. There was a dark red colour of the mucous coat of much of the colon. In the sigmoid flexure of the colon and in the rectum, the coat was thickened and showed granules of lymph on its surface, similar in many respects to those in the ileum. Many of the mesenteric glands were enlarged but none tubercular.

The right kidney was healthy ; the left atrophied was an inch and a half in its long diameter, half an inch in its transverse diameter, and when incised presented little secretory texture.

82. *Lobular Pneumonia coming on with the Decline of the Eruption. — Very little Gastro-enteric Complication.*

Eliza Matthews, aged twelve, of delicate frame and deformed chest ; born of European parents, entered the Byculla schools in March, 1833, was frequently affected with porrigo of the scalp ; and from September, 3rd, 1838, to 1st October, was under treatment for pneumonia of the right side. This girl was admitted into the sick ward on the 31st December, with mild catarrhal symptoms ; and on the first January, the eruption of measles appeared on the face and chest ; the skin was cool and the bowels had been opened by medicine. On the 2nd, the eruption, though moderate on the face and chest, had not extended to the extremities ; the symptoms were mild and no medicine was given. On the 3rd, the eruption was abundant and vivid on the face, chest, and arms, and was beginning to appear on the lower extremities ; the catarrhal symptoms had increased and the tongue was furred. On the 4th, the eruption was less on the face ; the respiration was oppressed, and there were rhonchi general on the anterior part of the chest ; the tongue was furred in the centre and florid at the tip ; the bowels were rather relaxed. On the 5th, the eruption was still distinct ; there was mucous rhonchus on the left side of the chest ; towards evening the respiration became hurried. On the 6th, the respiration continued hurried, and there was crepitous rhonchus audible in different places on both sides of the chest ; pulse 120 and compressible ; tongue florid at the tip ; two evacuations ; no vomiting ; eruption nearly gone. On the 7th, the respiration continued hurried ; the rhonchus was mucous under the right clavicle, and crepitous at the lateral parts of the chest, the face was pale ; and on the abdomen where the eruption had been, there was a livid tinge. The blister had risen well, but there was no surrounding erythema ; the tongue was red at the tip, and glazed ; the pulse 120 and feeble. At noon the temperature of the skin had increased, there was less pallor of countenance, and the pulse was of better strength. On the 8th, the respiration continued laboured ; pulse 108 and feeble. On the 9th, the symptoms had all become aggravated ; the pulse was thready and she died at 7 P.M. Treated with leeches, blisters, antimonials, calomel and ipecacuanha, then carbonate of ammonia and wine.

Inspection ten hours after death. — *Chest.* The lungs did not collapse and they were emphysematous on their anterior aspect. There were some old adhesions of the posterior part of the left lung to the pleura costalis, and that part of the lung was gorged with sero-purulent fluid; the thin edges of the lower part of the upper lobe were in a state of red hepatization. The right lung adhered firmly to the costal pleura, and was more gorged with sero-purulent fluid than the left; there were also one or two nodules of red hepatization. The bronchial lining membrane of both lungs was of dark red colour. — *Abdomen.* Many of the mesenteric glands were enlarged; some of them larger than an olive and showing a dark red colour when incised. The mucous coat of the stomach was patched red here and there, but was quite natural in texture. The mucous lining of the end of the ileum was vascular but of natural texture. That of the colon was healthy. The liver was healthy.

83. *Lobular Pneumonia.* — *Faint Eruption complicated with Gastro-Enteritis.*

Anne McCabe, aged nine, of European parents, subject to porriginous affection of the scalp, and occasional accessions of intermittent fever—the latter occurring frequently on the decline of the former—was admitted into the sick ward of the Byculla schools on the 1st January, 1839, with slight catarrh, tender eyes, and the commencing eruption of measles, but no fever. On the 2nd, 3rd, and 4th, the eruption continued very faint, but on the latter day the cough had increased; the tongue was furred in the centre, and florid at the edges; and there had been diarrhoea during the night. The warm bath was used and a powder of chalk and mercury, chalk and opium with ipecacuanha was given. On the 5th the eruption was still faint on the face and trunk, and had not extended to the extremities; the respiration was oppressed and hurried; and all over the right side, the respiratory murmur was mixed with small crepitous rhonchus, and on the left side the murmur was puerile; the pulse 120 and compressible; the gums somewhat spongy; the tongue coated yellow; and the dejections yellow and watery. A blister was applied to the right side of the chest; sinapisms to the feet and a salt water hip-bath were used; and carbonate of ammonia and camphor mixture exhibited. On the 6th, the eruption was nearly gone and all the symptoms were aggravated; the crepitous rhonchus was heard on the left side under the clavicle. Powders containing a small quantity of

calomel, Dover's powder, ipecacuanha, and tartar emetic, were given every third hour, and the carbonate of ammonia was continued. The sinapisms and the hip-bath were repeated. On the 7th, aggravation of all the symptoms, and death at 11 A.M.

Inspection four hours after death.—*Chest.* The lungs on neither side collapsed, they were pale coloured and emphysematous, with purplish coloured patches, here and there; where, there was a purple patch, there, that portion of the parenchyma was in the second stage of hepatization. For the most part these patches were on the surface of the lung and extended in depth about a quarter of an inch. There were, however, also some hepatized nodules in the centre of the parenchyma, varying in size from that of a small bean to that of an olive; the largest was at the very apex of the upper lobe of the left lung, and was of the size of a walnut; the next largest was at the thin edge of the posterior part of the lowest lobe of the right lung. The bronchial mucous lining was of a red colour, but the tubes contained little mucus; and the lung when incised was rather dry than oozing out fluid. There were no adhesions of the pleuræ. —*Abdomen.* The mucous coat of the stomach presented throughout a deep rosy tint, dotted, not ramified, and tearing readily in small shreds under the nail. The aggregated glands of Peyer, close to the ileo-colic valve, were thickened and presented two or three superficial ulcerations. The lining membrane of the colon was of a deep rosy tint, but not ulcerated. —*Head* not examined.

84. *Vesicular Pneumonia and Bronchitis, developing at the Decline of the Eruption.* — *Redness of the Mucous Membrane of the Pleum, with Enlargement of Peyer's Glands.*

John Hutchinson, aged seven, a boy of the Byculla school, an Indo-Briton, was admitted into the sick ward on the 7th February, with the eruption of measles fully formed on his face and chest: tongue white. Some purgative medicine was given. On the 8th the eruption was not vivid; the tongue continued white and as the bowels had not been freely moved, the purgative medicine was repeated. On the 9th the tongue continued furred, and on that day and the 10th, there is no report of the state of the respiration; the only symptom noted is the continued furred state of the tongue. On the 11th he was feverish, the respiration was hurried, and there was a short cough; skin was cool; pulse frequent; tongue cleaner; and

bowels open. Ten leeches had been applied to the sternum. A blister was directed to the chest, and the sixth of a grain of tartar emetic every third hour. On the 12th the blister had risen well, and ten doses of the mixture had been taken; the respiration was hurried; there was a frequent short cough. On the lateral parts of both sides of chest, and on the posterior part of left side, there was distinct crepitus mixed with the respiratory murmur; the tongue clean and not florid; pulse 120; the skin had been hot during the night. Half-grain doses of tartar emetic were directed every second hour. Four doses of the medicine had been taken before the evening visit, and it was directed to be continued. At the morning visit of the 13th, nine doses additional had been taken and had not caused vomiting; the skin was soft; pulse 100, soft and compressible; the respiration continued hurried, the cough short, and the crepitous rhonchus general on the lateral parts of both sides of the chest. The tartar emetic solution was continued. At the evening visit, there was a febrile exacerbation, and the other symptoms continued unchanged; four doses of the mixture had been taken. It was ordered to be continued every hour for four doses, and then every second hour. Eight additional doses of the solution had been taken before the morning visit of the 14th, without vomiting, but there was pain of the epigastrium; the tongue continued moist; the pulse was frequent, feebler, and compressible; the respiration was more hurried, and the crepitus was still audible on the right lateral part of the chest. The tartar emetic solution was omitted and carbonate of ammonia with camphor mixture substituted; the disease progressed, and he died at 7 P.M. of the 14th.

Inspection fifteen hours after death.—*Chest.* Neither lung collapsed, and both were white and emphysematous posteriorly; there were not any costal adhesions. On incising the lung, there appeared here and there, and chiefly on the right side, small hepatized points, none larger than a horse-bean and few of them so large. Muco-purulent fluid oozed on pressure from the open mouths of the cut bronchial tubes, but there was no engorgement of the parenchyma. The mucous lining of the bronchi, was of dark red colour and the tubes were filled with muco-purulent fluid.—*Abdomen.* The liver was enlarged, was very pale, but not mottled on its incised surfaces. The mucous lining of the end of the ileum was reddened, and Peyer's glands were enlarged: the colon and the mesenteric glands were healthy. The mucous lining of the stomach was coated with a creamy layer, but its tissue was healthy.

Table showing the Strength of both Schools on the 1st December, 1838; the Number of Admissions from Measles, and of Deaths from that Disease.

	Aged 5 years and under.						Aged from 5 to 10.						Aged from 10 to 15.						Aged from 15 to 18.						Total.				Doubtful.		Grand Total.		Grand Total of both Schools.
	Boys.			Girls.			Boys.			Girls.			Boys.			Girls.			Boys.			Girls.			Boys.		Girls.		Boys.		Girls.		
	Indo-Briton.		European.	Indo-Briton.		European.	Indo-Briton.		European.	Indo-Briton.		European.	Indo-Briton.		European.	Indo-Briton.		European.	Indo-Briton.		European.	Indo-Briton.		European.	Indo-Briton.		European.	Indo-Briton.		European.			
	6	2	4	1	22	41	19	43	22	27	7	28	20	2	10	2	76	28	83	45	3	-	107	128	235								
Strength of both Schools on the 1st of Dec. 1838	5	1	2	1			12	10	26	9	22						22	16	33	14	2	3	40	51	91*								
Admissions from Measles -	-	-	-	1			1	-	1		-	-	1	-	-	-	1	-	1	3	-	-	1	4	5								
Deaths from Measles	-	-	-	-			-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								

* There were about ten more, the children of Matrons and others of the Establishment.

I now proceed to notice the second epidemic, that of 1846-47, and shall do so in the words of Dr. Coles. He thus writes* :—

“In the interval of eight years between the first and second epidemic, a solitary case of measles seems only to have occurred, and this is not unworthy of remark when the large number of children in the schools is taken into consideration, and who, it should be recollected, are year by year subjected to the same influences, and liable to the same exciting causes, as produced the two attacks above referred to. This single instance of the disease occurred on the 14th January, 1840, in a girl who was sent on the following day to the European General Hospital, and her removal seemed to have prevented the extension of the disease to any of the other children. Upon the breaking out of the epidemic of 1838-1839, and again of that of 1846-1847, a similar precautionary measure was adopted, but it was unattended with the same beneficial effects, for in neither instance was the spread of the disease thereby checked.

“During the last fourteen years, there have been three visitations of measles of an epidemic character in the schools, viz. in 1832-1838, and 1846, and this periodical recurrence is interesting as confirmatory, to some extent, of the accuracy of the observation of the older writers, who believed that the interval between each epidemic is a period of seven years.

“The introduction of measles into the schools on the present occasion, appears to have been effected by the admission of a child aged two and-a-half years, who had recently arrived from Kurachee, but who was sent, as soon as the disease was recognised, to the European General Hospital. This child was an inmate of the infants' school, which is in that portion of the building occupied by the girls, and on this account the disease might have been expected to show itself first amongst them, and this accordingly happened. On the 21st December, a girl without any initiatory fever was observed to be affected with an eruption resembling that of measles, and she was sent immediately to the European General Hospital.

“On the 23rd, another girl fell sick with the disease, and before the end of December there were two other cases.

“The introduction of the epidemic being now manifest, the

* Transactions, Medical and Physical Society of Bombay. No ix. p. 226.

utility of sending any more children to the Hospital was not apparent, and consequently no others were sent. From this time the progress of the disease in the schools was as follows:—

“*Girls’ School.*—On the 1st January, 1847, there were four cases, on the 5th two were attacked, on the 6th five, on the 7th two, on the 9th one, on the 13th eight, on the 14th three, on the 15th four, on the 16th five, on the 17th three, on the 18th two, on the 19th three, on the 24th one, on the 26th one, on the 28th two, on the 29th two, and on the 30th one. In February, one on the 9th, two on the 10th, one on the 17th, one on the 19th, and one on the 28th. In March only one case, on the 10th of that month.

“*Boys’ School.*—Here the disease did not show itself until the 16th January, at which time there had been thirty-six cases amongst the girls. On the 19th of January there were two cases, on the 24th one was admitted, on the 25th one, on the 26th four, on the 27th one, on the 28th one, on the 29th two, on the 30th four, and on the 31st two; on the 1st February two, on the 2nd two, on the 3rd five, on the 4th six, on the 5th seven, on the 6th ten, on the 7th eight, on the 8th six, on the 9th three, on the 10th one, on the 11th two, on the 12th three, on the 13th two, on the 14th two, on the 15th one. There was now no case for ten days, after which there was one on the 25th, another on the 28th, and the last one on the 4th of March.

The following is a Statement of the Monthly Admissions and Deaths from the Disease.

ADMISSIONS.								DEATHS.								
								Girls.	Boys.	Total.	Girls.	Boys.	Total.			
December	-	-	-	-	-	-	-	4	1	5	-	-	-			
January	-	-	-	-	-	-	-	49	20	69	1	-	1			
February	-	-	-	-	-	-	-	6	62	68	1	3	4			
March	-	-	-	-	-	-	-	1	1	2	-	-	-			
Total								-	-	-	60	84	144	2	3	5

“It will be seen from this table that the total number of cases treated was 144, and the deaths five, viz. three boys and two girls. The first fatal case was in a girl, admitted on the 6th of January, and died on the 16th, a good instance of the rapidity of the disease.

"The next fatal case was one of a boy, admitted on the 26th January, and died on the 2nd February; another occurred on the 4th February in a delicate little girl, admitted on the 15th January, and the two remaining ones, were in boys on the 17th and 21st of February, who were admitted on the 4th and 5th of that month respectively.

"Thus there were 144 cases treated, and five deaths out of a strength of 355 children; and this is a smaller number of fatal cases in proportion to those attacked than occurred in the epidemic of 1838-1839, when, according to the before mentioned report, the number of cases treated was ninety-one*, and the deaths five, viz. four girls and one boy out of a strength of 235 children.

"The present attack was obviously not of so severe and immediately fatal a character as the former one, although the number of admissions in proportion to the strength of the schools was very nearly the same in each instance, viz. about 4 per cent.

"But the sequelæ were much more severe, particularly ophthalmia, which afterwards prevailed extensively through the schools, and required months to elapse before it was entirely eradicated.

"The seeds of disease laid by this epidemic showed themselves for a long time afterwards in the mortality that resulted from bronchial, pulmonic, and dropsical affections—the general impairment of health and the great impoverishment of the system, but too often had a fatal termination in cachexia. There was nothing in the nature of the particular symptoms in any case calling for special remark. The disease was very much the same as it has always been observed in this country, and I have nothing new to add.

"Initiatory fever about as often escaped observation as it was seen; tender eyes prevailed more among the boys than the girls, and the former suffered more in proportion from the subsequent ophthalmia. The faintness of the eruption did not at all warrant the opinion that unfavourable symptoms were more likely to come on, but the decline of the eruption was the usual period when they appeared, and they generally consisted of some inflammatory affection of the lining membrane of the air passages and lungs, ran rapidly through their course, and were often accompanied with gastro-enteric irritation.

"The treatment was usually by emetics of ipecacuanha in the

* 100, not 91. See note to Table, p. 351.—C. M.

first instance, followed by a simple laxative, and salines; leeches, tartar emetic, and calomel were employed in those cases of pneumonia which occurred, but with different results, whilst in convalescence, much dependence was placed in substituting a better diet, and the exhibition of tonics.

“Regarding the sequelæ of ophthalmia, I would remark that the cases I had an opportunity of seeing were, for the most part, severe and rapid ones, hastening on in the more scrofulous children to ulceration of the cornea, and unless checked at a very early period, they usually terminated in staphyloma.

“The admissions from ophthalmia from the 10th March (the date of the last case of measles) were very frequent, and no instance occurred to my knowledge of any child who had been attacked with measles escaping from the morbillous form of this affection.

“Before the epidemic of measles appeared in the schools, there were three cases of whooping-cough, and after its cessation several cases occurred, and it was extremely interesting to watch the progress of both diseases at the same time in the same individual.”

Mr. Carter in his Medical History of these Schools, for the five years ending July 1st, 1852, thus describes* the epidemic measles of 1852:—

“The month of March, always a suspicious one in these schools, had hardly numbered thirteen days, when measles broke out. A little girl, nine years old, of fair complexion, had been admitted into the schools on the 6th from Kirkee, bringing nothing of her previous history with her; and on the 13th was sent into the hospital with slight fever and redness of skin, so mild that, with the absence of cough and sore eyes, it was doubtful whether she was not suffering from roseola; still, it bore such a resemblance to measles, that it only required what afterwards occurred, viz., the appearance of more marked cases of the latter, to make it one. She soon recovered, and was discharged on the 21st; and four days afterwards, viz. on the 25th March, nine genuine cases, all from the girls' school, were admitted into the hospital, with the premonitory symptoms of measles. It was now evident that the disease was in the schools, and preparations were made for opposing its spreading as much

* Transactions, Medical and Physical Society of Bombay. No. i. New Series.

as possible; not that the disease might be entirely checked, but that the virulence of its infection might be lessened, by diminishing the number attacked at one time. All, therefore, who could be sent out of the hospital* were discharged to their respective schools; and every precaution taken to prevent the well from mixing with the sick children.

“By the end of March the cases had increased to 15, viz. 13 girls and 2 boys (the two latter belonging to the infant school), no case having yet occurred in the boys’ school. During the month of April 77 cases were admitted, viz., 54 more from the girls’ school (among which were 10 male nursery children), and 23 from the boys’ school.

“The first case in the boys’ school occurred on the 10th April, and that, too, in a little boy who was in hospital, where, of course, he was more likely to come in contact with the girls than if he had been in his own school; and during the month of May 15 more cases were admitted; but no more from the girls’ school. The last case from the girls’ school was admitted on the 22d April.

“Thus the disease terminated with an isolated case, as it had commenced, and with this difference only, that the last was a little more marked than the first. The following table will give the number, age, caste, date of admission, supervening or consequent affection, and date of discharge or death of all the children, viz. 107, who were attacked during this visitation of measles”:—

After inserting the table, Mr. Carter thus continues:—

“From this table it will be seen, that with the exception of two cases of measles, viz. the first and last, all of those, viz. 69, which occurred in the girls’ school were admitted between the 25th March and 11th April inclusive, or within 22 days of each other; while in the boys’ school, where there were but just half the number of cases, viz. 38, they extended over a period just twice as long, viz. 40 days exclusive, in like manner, of the first and last cases. Hence it may be inferred that the infection was most virulent during the commencement of the visitation; and certainly the cases were then most severe, but

* Through Mr. Carter’s kindness I was allowed the opportunity of frequently visiting the School Hospital during the prevalence of this epidemic.

there was nothing throughout malignant, saving one case of dysentery, which I shall presently endeavour to show might have been rendered so by the infection of measles.

“In some instances, the attacks of measles were ushered in by hardly any premonitory symptoms; the eruption was sometimes slight, sometimes livid; sometimes it partly disappeared, and then returned again with great force; in one case only there was epistaxis. There was more or less cough and inflamed eyes with all—in one or two gastric irritation, and in most diarrhœa; which latter, perhaps, was the most troublesome accompaniment, as it appeared even more likely to run into dysentery than the cough into pneumonia. Throughout there was a marked drowsiness, and many children seemed to sleep through the attack. Pneumonia and dysentery, or diarrhœa, combined or separate, supervened in several cases; and, when either went to any extent, terminated, with but one exception, fatally.”

When we compare measles as occurring in Bombay, with the epidemics of colder climates, we find it to be of equal if not greater severity. The average rate of mortality in the Byculla schools* has been 4·6 per cent., whereas that of European countries is stated to be not higher than 3 per cent.†

Nor is it difficult to understand how this should be. The proneness of the asthenic constitution in India to become affected with pneumonic inflammation, has been already alluded to, and will be more fully illustrated in a subsequent part of this work. It has been also shown that January, February, March are months in which measles is apt to prevail. Though the absolute temperature of these months in Bombay is high compared with that of European countries, yet the daily range is great re-

* Dr. Mackinnon, in his remarks on the Epidemics of Bengal and the North-western Provinces, states the mortality from measles in the children of European soldiers to be eight per cent.—*Indian Annals, of Medicine*, No. iii. p. 171.

† Lectures on Diseases of Infancy and Childhood, by Dr. West. 3rd edition, p. 582.

latively to other seasons of the year; and the more or less prevalence of north-easterly winds in these months also increases the heat-abstracting property of the atmosphere. When we consider these facts and the additional one that the heat-generating power of the animal system has relation to temperature of season and climate, we can be at no loss in understanding how the predisposed become affected with pneumonia in Bombay, and how cold is an exciting cause.

There is moreover probably more danger in measles from gastro-intestinal inflammation in Bombay than obtains in the same disease in more temperate climates. And as an additional cause of high mortality, the greater obscurity of pneumonia in asthenic states, and the less control over its course, are worthy of being mentioned.

There is a circumstance in the character of the eruption, as it has been observed in the Byculla schools, which it is of importance to note. In the accounts of measles as occurring in European countries, paleness of the eruption is pointed to as of unfavourable import. This is no doubt true of the more sthenic children of these countries, and it is equally true of well-conditioned European children in India. But in an Indian epidemic we may expect frequently to meet with the disease in children more or less anæmic; and in these the eruption will be found occasionally to present a faintness of tint which, in a sthenic child, might excite apprehension, but which in them is quite compatible with a mild and favourable course.

My remarks hitherto have had reference to a single institution; and I would now inquire to what extent measles has prevailed in other classes of the Bombay community.

Among the children of the better classes of the

European Society, I do not recollect an instance of its epidemic prevalence. But sporadic cases have been met with from time to time. I remember, however, only two as coming under my personal observation. They occurred in the month of June, 1853.

In the fatal cases of European officers, from 1829 to 1848, I find one fatal case of measles. It occurred at Belgaum in February, 1832, in an officer of the staff. The initiatory febrile symptoms were congestive in character; they continued from the 9th to the 13th, when the eruption came out. On the 14th this officer imprudently sat up exposed to cold, and attended to some of the duties of his office. On the evening of that day he complained of sore-throat, which had increased on the following day with addition of oppression of the chest and delirium. Symptoms of collapse came on, and he died on the 15th.

As regards the general population of the island of Bombay, it appears from Mr. Leith's Register that, during the five years from 1st February, 1848, to 31st January, 1852, 323 deaths from measles are recorded; and of these 212 occurred in children under seven years of age. In the following classification of these deaths, made with reference to the months of their occurrence, the preference shown by the disease for the first six months of the year is again well illustrated.

January	-	-	-	-	32
February	-	-	-	-	48
March	-	-	-	-	47
April	-	-	-	-	63
May	-	-	-	-	57
June	-	-	-	-	41
July	-	-	-	-	15
August	-	-	-	-	4

Carried forward - - 307

	Brought forward	-	307
September	-	-	1
October	-	-	7
November	-	-	4
December	-	-	4
			<hr/>
Total	-	-	323

SECTION III.

SCARLATINA. — ERYSIPELAS. — VARICELLA. — HOOPING COUGH. —
CYNANCHE PAROTIDEA.

SCARLATINA.— We have not any satisfactory account of the occurrence in India of the scarlatina simplex, anginosa, and maligna of European countries.

A fever, remittent in character and with scarlet eruption, has prevailed epidemically on several occasions, since 1824 to 1853, in Bengal and the North-western Provinces. In some instances the mucous membrane of the mouth and fauces has been inflamed; but in others this feature has not been observed. In the earlier epidemics rheumatic pain of the joints was frequently noticed; but this has not been the case in the later visitations of the disease.

I am not acquainted with the occurrence of a similar epidemic in any part of the Bombay Presidency. I have however met with an occasional case of remittent fever in natives attended with an eruption resembling roseola. The same kind of eruption has also been observed by me in a few instances in the secondary fever of cholera.

The Bengal epidemics have been described by Drs. Mellis, Twining, Cavell, Mouat, and H. H. Goodeve, in the first, second, and ninth volumes of the Transactions of the Medical and Physical Society of Cal-

cutta; also by Dr. Edward Goodeve in the second number of the *Indian Annals of Medicine*; and by Dr. Mackinnon in his *Treatise on Public Health*; and in the third number of the *Indian Annals of Medicine*. None of these authors have considered the disease described by them as identical with European scarlatina.

ERYSIPELAS.—The remark made by Dr. Mackinnon, that “idiopathic erysipelas, as it appears on the face and lower extremities unconnected with wounds, is a rare affection in India,”* is fully confirmed by observation in Bombay. I have met with very few cases either in Europeans or in natives.

But traumatic erysipelas is of more common occurrence, and at times evinces almost an epidemic tendency. It was common in the Jamsetjee Jejeebhoy Hospital in November and December, 1851, after wounds of the scalp and lower extremities, but was easily subdued. It did not in all cases originate in the hospital, but in some was present on the admission of the patient; thus showing that it was not, at least in all cases, due to the air of the hospital. On one or two occasions I have also noticed the tendency to erysipelas after the application of blisters so well marked, as to render it expedient to discontinue, for the time, the use of this remedy.

VARICELLA.—In my observations on measles, I have already alluded to the occurrence of twenty-nine cases

* *Indian Annals of Medicine*, No. iii. p. 177. It may be well to bear in mind immunity from scarlatina and erysipelas in India, in reference to the question raised by some pathologists of relation between these affections.

of varicella in the boys' school at Byculla in March and April, 1838. I do not find in my notes any particular account of this epidemic; but since then I have from time to time seen cases of this disease, and I am satisfied that I have never applied the term *Varicella* to an affection varioloid in character. The convex vesicle, perfectly pellucid at first, subsequently becoming opaque, and showing itself in successive crops, is, I think, quite distinct from the depressed vesicle of modified small-pox.

Mr. Carter states that, in the year 1849, a varioloid form of varicella affected twenty-four boys in the school, but only one girl, in the months of March, April, and May. I am unable to say whether this epidemic differed from that of 1838, or whether the term varioloid used by Mr. Carter merely indicates a difference of opinion on the part of the observers.

HOOPING-COUGH. — In Dr. Coles' Report on Measles in the Byculla schools, there is allusion made to the presence of three cases of whooping-cough at the same time. I do not find any account of the epidemic prevalence of this disease in these schools; but my impression is that it has occurred from time to time during the course of the last fifteen years.

CYNANCHE PAROTIDEA attacked the girls' school in February and March, 1837. Seventy-four girls were affected, not a single boy. Mr. Carter reports that it broke out among the boys in October and November, 1851. Seventy-five boys were affected, but only two girls.

CHAPTER VI.

ON EPIDEMIC CHOLERA.

SECTION I.

REMARKS ON THE SEASONS OF PREVALENCE AND ON THE CAUSES OF CHOLERA.

IN the European General Hospital 234 cases of cholera, and in the Jamsetjee Jejeebhoy Hospital 1259, were treated during my periods of service in these institutions. I have also had the opportunity of investigating this disease in other parts of the presidency as well as among the better classes of the community, both European and Native, in the island of Bombay.

In my remarks on cholera I shall state the results of personal observation and inquiry, and the practical conclusions to which I have been led by my own experience, and by careful consideration of much that has been written on the subject, both by Indian and European writers.

My connexion with hospitals in Bombay extends from June 1838 to May 1854, and from these sources I learn, that in the years 1841, 1847, and 1848, there was very little cholera in the island. It, however, prevailed extensively in the years 1842, 1846, 1849, 1850, 1851, 1853, and 1854.

The greater prevalence of cholera in some years than in others in Bombay is also apparent in the facts noted in Mr. Leith's Mortuary Register. There we learn that

the proportion which the deaths from cholera bore to the total deaths in the island in different years, was as follows:—

1848	-	-	-	·63 per cent.
1849	-	-	-	17·40
1850	-	-	-	27·850
1851	-	-	-	27·75
1852	-	-	-	8·40

The greater prevalence of cholera in the warmer months of the year in European countries, has been supposed to depend on elevated temperature favouring an impure state of the atmosphere by increasing decomposition.* But as the heat of an Indian climate must always be sufficient to cause atmospheric impurity in this manner, we may infer, if the view stated in respect to European countries be correct, that cholera in India will not show a preference for particular seasons. My own observations certainly lead me to this latter conclusion. The admissions into the European General Hospital at Bombay from 1838 to 1853, are, for the half year from April to September, 234, and for that from October to March, 114. This statement seems to countenance the relation of the disease to the hotter months of the year; but then it is corrected by a reference to the Jamsetjee Jejeebhoy Hospital, which shows (from 1848 to 1853) 417 admissions for the first half year, and 637 for the second. A reference to Mr. Leith's Mortuary Returns, from 1848 to 1852, also gives the greatest number of cholera deaths in the half year which includes the cold season, viz. 7,112 for the half year from October to March, and 5,110 from April to September.

But it may be supposed from these statements con-

* Report on the Cause and Mode of Diffusion of Epidemic Cholera.
By William Baly, M.D. 1854.

sidered in connexion with remarks made in Mr. Webb's report on the medical statistics of European troops in the Bombay presidency*, that cholera affects Europeans most in the hot and rainy seasons, but natives in the cold season. This conclusion is, however, corrected by tabular statements before me, relative to the disease in Calcutta. The first† has reference to the general population of the city, from 1832 to 1838, and shows, for the half year from April to September, 9,560 deaths, and for that from October to March, 8,555.

The second‡ relates to the European General Hospital at Calcutta from 1842 to 1853, and gives from April to September 358 admissions, and from October to March 383.

I conclude, then, that though partial data may suggest that cholera has in India also its seasons of preference, the conclusion is not as yet sustained by general and extensive inquiry.

The *cause* of cholera is as yet undetermined. If we regard the various opinions which have been put forth on this subject, the want of precision and completeness in many of the statements and the hypothetical character of much of the reasoning on which the opinions rest, it is impossible to avoid the conclusion, that at the present time the records of medical science are altogether inadequate for the solution of the question.

In the course of three epidemics of cholera in Bombay (from 1849 to 1854), 158 inmates of the Jamsetjee

* Transactions, Medical and Physical Society of Bombay, New Series, No. i. p. 104.

† Mr. Martin, Influence of Tropical Climates, &c. p. 354. Edition of 1841.

‡ Notes on Cholera, by John Macpherson, M.D. Indian Annals of Medical Science, No. i. p. 111.

Jejeebhoy Hospital, while under treatment for other diseases, have been attacked with cholera, and 73 of them died. At the time of these occurrences, I caused a record to be kept, showing the date of the attack, the bed of the patient, the date of admission into hospital, and the disease for which he was under treatment. I entertained the hope that these facts might throw some light on the etiology of cholera. They have been carefully considered by me, and I have come to the conclusion that though a considerable part of them are trustworthy so far as they go, yet they are defective in so many particulars necessary to justify positive conclusions in an inquiry so difficult and important, that I have determined to withhold their detailed record. I adopt this course, because I am satisfied, that nothing so surely impedes the progress of medical science as the strained applications made by some writers of the observations and statements of others.

The occurrence, however, of so many attacks of cholera in one institution, can hardly have taken place without seeming to point to certain general inferences, which I need not have any hesitation in stating :—

1. Cholera prevailed in the divisions of the town adjacent to the hospital, so that the cause may be assumed to have been operative on the residents of both.

2. A considerable proportion of the seizures were of individuals only a few days resident in the hospital, and who may therefore have been infected before admission.

3. A considerable proportion were simultaneous with increase of the disease in the island generally, and therefore justified the inference that a general cause was in operation.

4. They occurred more or less in all the fourteen wards of the hospital, but in considerably greater number in those in which from position, nature of disease, or

number of inmates, atmospheric impurity was most likely at times to be present.

5. The greater number of attacks were in individuals cachectic or debilitated. The influence of predisposition was very apparent.

6. The cholera sick in the hospital, whether admissions or seizures, were treated in the verandahs of certain wards, and were so arranged as to be widely apart from each other. The ward which adjoined the verandah in which cholera patients were most constantly present, was that in which, in one epidemic, the fewest cholera seizures took place; and in which, in another epidemic, the seizures were fewer than in several other wards.

These statements seem to point to a relation between the cause of cholera and an atmospheric state, external to, as well as in, the hospital; also a relation to impure conditions of the atmosphere and states of individual predisposition.

The portable or contagious property of the cholera poison is not supported by these statements; and it is chiefly with reference to this question that we require facts more complete, precise, and detailed than these, or than any as yet observed and recorded. My present impression on this question is, that if any of the spread of cholera be due to human intercourse, the degree is very limited indeed. My practice with reference to it is to pay great attention to scrupulous cleanliness and ventilation around cholera sick, and to place them widely apart from each other; for setting aside the question of communicability, nothing is so likely as exhalation from the discharges and bodies of the sick to produce the impurity of atmosphere, the relation of which to the disease is so very probable.

Before leaving the subject of the causes of cholera, I would remark that the occurrence of the disease after exposure to cold or wet, has been occasionally observed; and it may be presumed that the relation which subsists between these ordinary exciting causes of disease and the special cause of cholera, is the same as that which obtains between them and malaria in respect to occasional attacks of intermittent fever. They are determining causes.

SECTION II.

SYMPTOMS CONSIDERED IN REFERENCE TO THEIR DEGREES OF SEVERITY.—DIAGNOSIS FROM BILIOUS CHOLERA, IRRITANT POISONING, AND COLLAPSE OF REMITTENT FEVER.

I SHALL assume that the student of clinical medicine is already familiar with these leading features of epidemic cholera. That the access of the disease is frequently in the night, often coming on without previous warning; but, at other times, being preceded by diarrhœa of longer or shorter duration. That the characteristic symptoms are the rice-water like alvine discharges, the vomiting of watery fluid, spasms of the extremities, or muscles of the abdomen, restlessness and anxiety, a skin cold, damp and clammy, sunken eyes and shrunken features; a quickly failing, and finally imperceptible pulse, much thirst, suspended secretions, a whispering voice, and intelligence languid but not deranged. There is considerable range in the degree in which, and the rapidity with which, the phenomena of suspended vital actions—collapse—take place; and neglect of this feature of the disease has led to much inaccurate statement in regard to the value of different remedial means.

The characteristic alvine discharges are the pathognomonic symptom of cholera. They may be present in varying degrees, associated with more or less—sometimes hardly appreciable—muscular spasm, and with different degrees of collapse. The following classification is convenient for practical purposes.

1. Cases in which, after three or four hours of the characteristic vomiting and purging, with some amount of spasm, the countenance becomes somewhat collapsed; but the temperature of the skin remains still good, and the pulse of tolerable strength. There is generally a varying proportion of this degree of the disease met with in epidemic visitations in European regiments in India. If such cases be judiciously treated, a very considerable number may be expected to recover.

This mildest form of the disease is very seldom met with in natives, or in the classes of Europeans, who resort to general hospitals in India.

2. Cases in which, after six or seven hours of more or less characteristic purging, vomiting, and spasm, the countenance becomes sunken, the skin cold and damp; but the pulse, though small and feeble, is still distinct, and the respiration without hurry or oppression. This degree of the disease is met with both in natives and Europeans. It may be considered the mildest form in natives as well as in Europeans, as seen in general hospitals. It is not, I believe, merely the first degree aggravated by longer duration; for it will be found that the phenomena of greater failing vital action have been present from the very outset, and have been little under the control of medical treatment. Still, a considerable proportion of this form of the disease recover, probably more than one-half.

3. Cases in which, after from one to six hours of

characteristic vomiting and purging,—often not to great amount,'—the skin becomes cold and clammy, the countenance sunken, the voice almost gone, the restlessness great, the pulse imperceptible, and the respiration begins to be hurried and anxious. This degree of the disease occurs both in Europeans and natives, and recoveries, though occasional, are few in number. The very speedy collapse, unattended by the cholera discharges, mentioned by some writers, has not, to my recollection, been observed by me; but I should think it a very possible occurrence, for the scanty watery secretion may take place into, and be retained in, the intestinal canal.

The two last degrees of the disease are by far the most common at the present time in India, and have been so during the whole period of my service in that country. The first degree would seem to have been met with more frequently in the epidemics between 1818 and 1824. This opinion is entertained by Mr. Martin, and many of the cases detailed by Sir James Annesley point to the same conclusion.

I have not thought it necessary to notice particularly that form of disease described as occurring in sthenic Europeans in India, in which there are urgent cramps, a warm skin, a flushed countenance, and a pulse full and firm. This must be rare, for I cannot bring to my recollection more than one instance, and that was in the year 1830, in a soldier of Her Majesty's 40th Regiment, at Vingorla; yet these symptoms have been erroneously classed with epidemic cholera, and their successful treatment by general blood-letting was one of the circumstances which led to the adoption of the same means in the very different form of disease, of which I now treat.

I shall next endeavour to follow the course of the three degrees under which I have classed the symptoms of epidemic cholera. In the first, the recoveries are numerous, the derangements pass away, and the several functions are gradually restored to their normal state. In unsuccessful cases the fatal result may be brought about by increasing collapse, or by consecutive fever with or without the complication of secondary inflammations. I do not, however, dwell on this milder disease, because my clinical experience has been chiefly of the severer forms. In a large proportion of these (second and third degrees), the pulseless collapse, which has taken place in periods longer or shorter, persists, though the serous discharges from the bowels may have ceased, and the cramps have abated; the respiration becomes hurried, and death follows in from four to thirty-six hours, dating from the commencement of the symptoms.

When, however, a fatal result has not occurred in the stage of collapse, then the disease may pursue one of the following courses:—1st. There is gradual and slow improvement in the pulse; the skin loses its dampness, and its temperature slowly returns; the alvine discharges become less frequent and watery, assume first a turbid and milky appearance, then become coloured, and gradually restored to their normal state; and the secretion of urine, which had been suspended during the stage of collapse, becomes slowly established.

It is when the stage of collapse has not been of long duration—not exceeding seven or eight hours—that we may hope for this favourable course of the disease. It is, on the other hand, when the stage of collapse has endured eighteen hours and upwards (though recoveries may still take place in the manner just described), that

we may apprehend one or other of the remaining more unfavourable issues.

2. The restoration of function, and final recovery, may be retarded by gastro-enteric irritation, or inflammation, characterized by a florid tongue with central yellow fur, uneasiness at the epigastrium, vomiting of ingesta, yellow watery, or greenish gelatinous dejections, associated with a dry skin, and often some degree of febrile heat, and frequency of pulse.

3. Whilst the pulse and temperature of the skin have been gradually restored, the alvine and urinary excretions may continue suppressed, the conjunctivæ become gradually injected, and the manner sluggish; then distinct drowsiness may arise and pass into coma. In these cases the drowsiness is occasionally preceded by low delirium; and a preternatural slowness of the pulse may sometimes be the first symptom calculated to fix our attention on the cerebral functions. This train of symptoms, if it has not passed beyond the state of drowsiness, is sometimes recovered from (cases 115, 116, 117.).

4. The stage of collapse may be at once distinctly succeeded by one of febrile reaction, more or less adynamic in character, complicated, it may be, with gastro-enteritis or cerebral or pneumonic symptoms, or more or less absence of alvine and urinary excretion.

5. In asthenic individuals there may be restoration of function, and yet death from secondary exhaustion, without any very evident local complication.

Though the general favourable import of restored urinary and coloured alvine discharges in the course of cholera is not to be doubted, yet, I am sure, that often needless alarm is experienced from their absence, as well as too much hope sometimes entertained from their reappearance.

So long as the skin continues cold and the pulse absent or very feeble, it is not in accordance with sound physiology to look for restoration of either the biliary or urinary secretions (cases 102 to 109.). Again: if the collapse has not exceeded eight or ten hours, we need not be under any apprehension from the non-appearance of the excretions during the succeeding twelve or eighteen hours of the *gradual* return of the circulation and of animal heat.

But if the collapse has endured for eighteen hours and more, then, as already explained, with the return of the circulation and of animal heat, all secondary dangers—those arising from defective excretion included—are increased. The more completely and speedily the circulation has been restored after this long collapse, the greater is the risk incurred by the continued suppression of the urinary excretion.

These statements, deduced from clinical observation, are in strict accordance with theory. While the processes in which the capillary circulation is concerned are suspended during the stage of collapse, we cannot look for metamorphoses of tissue and the formation of products of excretion; but the longer that collapse has endured and the more completely it has been removed, the more surely shall we have excretory products formed and the necessity for their elimination created.

Though we may admit that there is a probable relation between uræmia and cerebral symptoms, and perhaps other local derangements, yet we shall be disappointed if we always expect to find head symptoms removed on the return of the urinary secretion. Cases 128, 129. illustrate the truth of this remark.

Again, we must be careful when we attribute the removal of drowsiness to the restoration of the urinary

secretion, that we have not mistaken the drowsiness which occasionally attends upon the stage of collapse for that which is secondary, which occurs after reaction, and which alone can be related to uræmia. There is still another clinical remark to be made with reference to the urine. The early observers of this disease confounded suppression with retention of urine, and used the catheter. Now there is an occasional risk of our mistaking retention for a continuance of suppression and neglecting the use of the catheter (cases 100. 130.).

It has been already stated, that as the profuse watery alvine discharges cease, they become less thin, and assume a milky appearance; there is, in fact less of water and more of epithelial debris present. This change, in favourable cases, is a state intermediate between the watery and the coloured discharges, and may continue for twelve hours and more after reaction has taken place. Nor are we to assume from the continuance of these scanty milky-like discharges, that the case is progressing unfavourably. They were present in the intestinal canal as the residue of the transudations of the stage of collapse, antecedent to the commencement of reaction, and must necessarily pass away before more normal discharges can appear. Moreover, if during the stage of transudation the integrity of the intestinal epithelium has been seriously compromised, it is surely reasonable to suppose that its restoration will be amongst the earliest actions of returning health, and one desirable to have effected before biliary secretions are brought into relation with the intestinal surface. Then just as in respect to the urine, clinical observation and theory lead me to the practical conclusion that for twelve or eighteen hours after the

commencement of reaction, more particularly where the collapse has been of short duration, we need not attach any importance to the alvine discharges not becoming of normal colour.

In occasional instances the dejections in the stage of collapse are of a pinkish colour; they may be so, and not profuse, from the commencement, or they may present this appearance at a later period when they have ceased to be very watery. Such discharges are of most unfavourable omen. I have never known an instance of recovery. Cases 123, 124, 125. illustrate this remark. This kind of discharge I have only witnessed in natives in the Jamsetjee Jejeebhoy Hospital. It is caused, no doubt, by partial transudation of the colouring matter of the blood.

Dr. Macpherson, in his Notes on Cholera, published in the first number of the Annals of Indian Medical Science, cites two interesting cases which occurred to him in the General Hospital at Calcutta of hæmatemesis in the course of cholera. Of this I have never met with an instance. It is not improbable, however, that the pink-coloured discharges of which I now write are of more frequent occurrence in Bengal than in Bombay, because hæmorrhage from the bowels is certainly more common there.

The observation made in the report on cholera by the Madras Medical Board, that hiccup is not of that unfavourable import in this disease which it is in many others, accords with what I have myself noticed. It occurs, I think, generally in cases in which the collapse has been long, and the reaction slowly established; is coincident with the latter state, and though often, is not necessarily, associated with gastric irritation.

The *diagnosis* of epidemic cholera is well marked

when the disease is fully formed. The cramps and the prostration coexisting with the peculiar discharges, are sufficiently characteristic to distinguish it from bilious cholera, with its bile-tinged discharges, coated tongue, transient prostration, and occasional cramps. If I may draw a conclusion from my own field of inquiry, I would say that bilious cholera is a rare form of disease in Indian hospitals, particularly so in those for native sick. When I refer to the returns of the European General Hospital at Bombay, I find, that of 20,147 admissions in fifteen years, only 74 were from bilious cholera, and 52 of these were during the six years of my service in that hospital. The deaths recorded under this head were three, occurring from 1845 to 1847. As during this period the admissions from bilious cholera amounted only to 4, we have a mortality rate from this disease of 75 per cent. A result so contrary to all experience, leads to the conclusion that these were cases of epidemic cholera, and the record therefore further shows that an error in diagnosis is a possible contingency. Then in respect to the Jamsetjee Jejeebhoy Hospital, I find, that out of 25,190 admissions in six years, there are only 2 of bilious cholera.

These facts justify the inference that bilious cholera is not a common disease in India in numerous classes of the community.

I am quite aware that in sthenic Europeans in India bilious vomiting, a flushed countenance, a coated tongue, and more or less derangement of the bowels after debauch, are sufficiently common; but such cases of disease, even if correctly classed as bilious cholera, cannot possibly be mistaken for epidemic cholera.

But another question of diagnosis may present itself in India, and it is a very important one.

In one* of the reports of the Bengal charitable dispensaries, it is stated that advantage is sometimes taken of the prevalence of cholera for the perpetration of acts of criminal poisoning, in consequence of the lessened chance of detection which exists under such circumstances of the public health. I concur in the justness of this remark; for I can say from my own observation in Bombay, that criminal poisoning, chiefly by arsenic, is, unfortunately, not rare, and that the great collapse which speedily comes on after a large quantity of the poison has been taken, sufficiently resembles that of cholera as to render the mistake in cholera seasons, when suspicion has not been aroused, by no means an improbable one (case 337.). If we have the opportunity of examining the vomited and dejected matters during life, there can be little difficulty in determining the question. The florid tongue and tender epigastrium of gastritis, will also assist in the diagnosis, but if in fatal cases doubt still remains, a *post mortem* examination will at once remove it.

At a time when cholera was prevalent, two children, a brother and sister, were brought to the European General Hospital ill with vomiting and purging. They died shortly afterwards, and there had not been any opportunity subsequent to their admission into hospital, of observing the character of the evacuations. There were circumstances connected with the commencement of the illness of these children, which raised the suspicion that something deleterious had been exhibited. An inquest was held. The parents were unwilling that the *post mortem* examination should be more minute than was sufficient to remove the doubt. I opened the

* I regret my inability at the present time to refer particularly to the Report and its author.

stomach and the end of the ileum; in both cases the mucous coat of the former was pale, that of the latter was studded with prominent Peyer's glands. On these appearances, coupled with the circumstance that cholera was prevalent, I grounded the opinion that these children had died of cholera, and not from any irritant poison having been given.

When treating of remittent fever I explained that the paroxysm sometimes terminated with unlooked-for prostration, thready pulse, cold skin, and death by syncope. I have known such an event viewed as an attack of cholera coming on in the course of fever, but we must be on our guard against an error of this kind. Cholera may doubtless occur in the course of fever (case 98.), and lead to a fatal issue; but there can be no difficulty in distinguishing such cases from the prostration at the close of a febrile paroxysm. The diagnosis will turn upon the relation of the prostration to alvine discharges, to the period of the paroxysm, and to the general course of the disease.

SECTION III.

PATHOLOGY.—THE GENERAL RATE OF MORTALITY. — ITS RELATION TO AGE, PERIOD OF EPIDEMIC, AND DURATION BEFORE ADMISSION CONSIDERED. — GENERAL PATHOLOGY SHORTLY NOTICED. — MORBID ANATOMY DESCRIBED AND ILLUSTRATED WITH CASES.

THE following extract from records before me illustrates the well-known mortality which is occasioned by this disease:

			Proportion of Mortality from Cholera, on Total Mortality.	
In European troops, Bombay Presidency	-	-	10·	per cent.
European officers, ditto	-	-	7·7	"
In Population, Bombay, for four years	-	-	20·35	"
European General Hospital, Bombay	-	-	14·5	"
Jamsetjee Jejeebhoy Hospital	-	-	13·9	"

In regard to the rate of mortality from cholera, there is a good deal of discrepancy in published statements. But this is easily understood, when we bear in mind that the severity of the disease varies in different epidemics, and at different periods of the same epidemic, and in different classes of individuals.

As an approximate statement, we may rate the mortality in India at from 30 to 45 per cent. in regimental hospitals, 50 to 55 in European general hospitals, and 60 to 65 in general hospitals for the civil native population of large towns, as the Jamsetjee Jejeebhoy Hospital in Bombay.*

The only investigations which I have made on the variation of the mortality rate, relative to age, to the period of the epidemic, and to duration of attack, refer to 159 individuals admitted into the Jamsetjee Jejeebhoy Hospital from the 17th August to the 31st December, 1849 ; of these, 94 died, and 5 remained under treatment on the 1st of January. The results are shown in the following tables :

* This is a considerably higher rate than appears in the appended return of this hospital for six years, and I so state it because the mortality has been higher in other years and there are occasionally patients removed in a precarious state by their friends, but entered discharged in the returns, and rated as recoveries.

A.

Ages: noted.	Numbers.	Rate of Mortality.
Under 10 years - - - - -	13	69· per cent.
Between 10 and 20 - - - - -	19	63· ”
” 20 and 40 - - - - -	112	58· ”
Above 50 - - - - -	10	50· ”

These numbers are too limited to be of much value as regards the question of age. The high mortality shown in the tables in very early life probably accords with the results of the epidemic cholera in England in 1849.* But in that epidemic the lowest mortality was from five to fifteen years of age. This does not appear to be a feature in cholera in India, either in the above table or in one in Dr. Macpherson's notes.† The low mortality above the age of fifty, in my statement, is opposed to the results obtained by Dr. Gull and Dr. Macpherson, and illustrates the errors into which we may be led by partial statistics.

The varying rate of mortality at different periods of the epidemic is clearly exhibited in the following table :

B.

Dates of Admission.	Rate of Mortality.
17th August to 3rd September - - - -	84·6 per cent.
4th September to 17th September - - -	72· ”
18th September to 1st October - - - -	75· ”
2nd October to 15th October - - - - -	47· ”
16th October to 29th October - - - - -	28· ”
30th October to 12th November - - - -	50· ”
13th November to 26th November - - -	50· ”
27th November to 10th December - - -	55·5 ”
11th December to 31st December - - -	43·3 ”

* Report on the Morbid Anatomy, Pathology, and Treatment of Epidemic Cholera. By William W. Gull, M.D., &c. p. 147.

† Annals of Indian Medical Science. No. i. p. 113.

With the view of endeavouring to determine to what extent the rate of mortality was influenced by admission into hospital at early or advanced periods of the attack, I made the following note in respect to 157 cases.

C.

Duration of Disease on Admission.	Numbers.	Rate of Mortality.
Under 5 hours - - - - -	38	63·3
5 to 12 hours - - - - -	49	61·3
12 to 24 hours - - - - -	48	45·9
Above 24 hours - - - - -	22	59·

That the highest mortality should be in those admitted at the earliest period of the disease, and the lowest in those in whom it had been present for upwards of twelve hours, may seem an unexpected result; but it is easily explained by those who are acquainted with the habits of the individuals represented by these figures,—with their unwillingness to resort for hospital relief in the early stages of illness.

The conclusion to be drawn from this statement is, that the admissions under five hours were cases of great severity, enforcing an early application for relief, hence the high mortality. On the other hand, those between twelve and twenty-four hours were milder, and had not yet entered on the risks of reaction. In the admissions above twenty-four hours there is again a rise in the mortality, depending, no doubt, on the fact that a proportion of these cases had been neglected, and that the secondary dangers had been incurred before admission.

To determine the proportion of deaths that takes place in the stage of collapse, and in that of reaction, is a question of interest, for it probably differs in the disease as observed in India and in European countries.

I have not any data that bear on this point. Dr. Gull* estimates the proportion of death from consecutive fever in England at one-tenth. Though the opinion generally entertained, that the proportion of deaths in the stage of collapse in India preponderates over that of the same stage of the disease in England, is probably correct; yet it is an error to suppose that the practitioner in India is not perfectly familiar with all the secondary phenomena and dangers of cholera.

From these statements relative to the mortality of cholera, I proceed to the consideration of the *Pathology*. That the general and capillary circulation of the blood, and all the actions of the system dependent on them, are more or less arrested in cholera, is the first clinical fact on which I fix my attention. That this arrest is favoured by the copious watery discharges in cholera, but is not mainly caused by them, is shown by the facts that not unfrequently the collapse is great, and the discharge is small; and that occasionally the prostration is moderate, and the discharges copious and long continued.

Whether the morbid cause acts first on the blood or on the ganglionic nervous system, is a question which physiological and pathological science are, in their present state, unequal to determine; and it does not come within the scope of a clinical treatise to engage in these theoretic discussions.

I proceed at once, then, to notice the morbid anatomy of the disease. Of the 17 fatal cases which I shall presently quote, 15 occurred in the stage of collapse, and 2 with secondary complication—one of the head, the other of the lungs and pericardium. These cases show that the morbid appearances which chiefly

* Report, p. 142.

attract attention after death, in the collapsed stage of cholera, are the following:

Head.—The vessels of the membranes are congested with dark-coloured blood, there is generally increased effusion of serum in the cavity of the cranium, but this state is not necessarily an evidence of drowsiness, or other head symptoms having been present during life.

Chest.—The lungs are generally well collapsed; the anterior surface is pale, with sometimes an inflated, or emphysematous state of their edges. There is, for the most part, a reddened colour of the lungs at their posterior aspect, with moderate congestion. The heart is sometimes flaccid, at others not so. The left ventricle is almost invariably empty; but the right one is more or less filled with blood, dark-coloured, generally quite fluid, sometimes with coexisting fibrinous coagula.

Abdomen.—Very commonly there is a blush of redness on the visceral peritoneum. The stomach is frequently distended, and its mucous surface generally pale, sometimes presents dotted or marbled red patches. The small intestines usually contain more or less of watery or milky-like contents similar to the cholera discharges. The mucous surface is for the most part pale and milky-like with the villi very distinct. The isolated and agminated glands of Peyer are very generally prominent; this has been chiefly observed at the lower part of the ileum, where the surface is often studded with the pale solitary glands, enlarged to about the size of a mustard seed. The large intestines are often contracted. The mucous membrane of the colon is pale, with the mucous follicles, with their dark depressed centres, frequently distinctly seen,

The mesenteric glands are often enlarged, but pale in colour.

There is, for the most part, little to attract attention in the appearance of the liver. Sometimes when incised it bleeds more freely than usual. A distended state of the gall-bladder is noticed in only one (95.) of the cases. From this I infer that there has not been usually any thing in the appearance of this viscus to attract my attention. In my cases little notice is taken of the state of the spleen, from which I conclude that it was not enlarged. Indeed, the frequent discharges must tend to cause it to shrink; of this I have had evidence in the case of an individual, in whom there was much enlargement of the spleen, becoming affected with cholera: the enlarged viscus had very much decreased in size before death. The kidneys are sometimes healthy in external appearance, sometimes they are congested.

Such is a summary of the morbid appearances in the collapsed stage of cholera, drawn from my own observation, and I am not aware that any important practical addition can be made to it from the writings of the latest observers, with exception of the minuter accounts of the condition of the kidneys.* I allude to the epithelial debris found in the uriniferous tubes and pelves of the kidney as explanatory of the albuminous state of the urine† on its re-appearance after reaction.

* Dr. Gull's Report, p. 32.

† Of this condition of the urine I am unable to speak from my own observation; it is a point to which, as yet, my attention has not been directed.

CASES OF CHOLERA FATAL IN STAGE OF COLLAPSE.

85. *Cholera.*—*Insensibility before Death; moderate Turgidity of the Vessels of the Meninges.*—*The Glands at the End of the Ileum, and Follicles of the Colon, distinct.*

John Sayers, aged twenty-three, of the ship "Juverna," was taken ill on the morning of the 21st May, 1839, with vomiting and purging; and took some castor oil. He was admitted into the hospital at 4 P.M. The skin was cold and damp, the surface livid, the eyes sunken, and the pulse imperceptible. A sinapism was directed to be applied to the abdomen, heat and friction to the extremities; a pill of acetate of lead was given every half hour and three drachms of brandy every quarter of an hour. There was no recurrence of purging, but he became insensible, and died at 7 P.M.

Inspection fifteen hours after death.—*Head.* The vessels and sinuses were moderately turgid with blood, and there was about an ounce and a half of serum in the cavity of the head.—*Chest.* The lungs were somewhat emphysematous; they were pale anteriorly and rosy behind, and when incised gave out some frothy serum. The left ventricle of the heart was empty and contracted. The right contained fluid blood, and large masses of fibrinous lymph.—*Abdomen.* There was a blush of redness over the intestines, and many of the mesenteric glands were of the size of a horse-bean, but were pale in colour. The stomach distended pushed the liver upwards to the diaphragm, and occupied all the epigastrium. The liver was not congested. The mucous coat of the stomach was healthy. The small intestine contained much rice-water-looking fluid. The mucous coat had a milky tint, and the villi throughout were prominent, and Peyer's glands at the end of the ileum were distinct. The mucous coat of the colon was healthy and pale, but studded with follicles with their depressed orifices quite distinct. The kidneys were healthy.

86. *Cholera.*—*No Insensibility.*—*Turgescence of the Vessels of the Pia Mater.*—*Serum at the Base of the Skull.*—*Lungs collapsed.*—*Glands at the End of the Ileum very distinct.*

Richard Shea, aged twenty, a seaman of the ship "Juverna,"

was admitted into the General Hospital, on the 22nd May, 1839, at 9 A.M. He had suffered from diarrhœa during several days, and the night before admission had become affected with much vomiting and purging attended with cramps. On admission into hospital the skin was cold and damp, and the pulse nearly imperceptible. No medicine had been taken. Sinapisms were applied to the epigastrium, heat and friction to the extremities, and an acetate of lead pill was directed to be given every half hour for four doses, and brandy three drachms every quarter of an hour. At $1\frac{1}{2}$ A.M. five pills had been taken, and ten doses of brandy had been exhibited. The pulse was perceptible; there had been no recurrence of purging, but the respiration had become laboured. The medicines were continued and sinapisms were applied to the feet. At 4 P.M. the respiration was much oppressed, a warm bath was ordered and grs. xv. of calomel were directed to be given with a draught containing liq. ammon. and spiritus ætheris nitrici. Died about $4\frac{1}{2}$ P.M.

Inspection fifteen hours after death.—*Head.* The vessels of the pia mater, and chiefly the veins, were very turgid with black blood, and there was about an ounce and a half of serum in the cavity of the cranium.—*Chest.* The lungs collapsed freely; there was dark discolouration posteriorly, but no congestion of blood. The heart was natural, the left ventricle empty, and the right one nearly so.—*Abdomen.* The vessels of the mesentery were distinct in consequence of their dark contents, and there was a blush of redness over the intestines. Many of the mesenteric glands were pale and of the size of a horse-bean. The stomach was distended. The upper part of the small intestines contained fluid, and the contents of the end of the ileum were of light yellow colour. The glands at the end of the ileum were very prominent, but the follicles of the colon were not very distinct. The mucous coat of the stomach was healthy and covered with mucus.

87. *Cholera.*—*Three or four Ounces of Serum in the Cavity of the Head.*—*Glands at the End of the Ileum enlarged and prominent.*—*No Congestion of the Lungs.*

John McGwicker, aged twenty-three, carpenter on board the ship "Ann Crichton:" on the 19th May, 1839, went to work on board the "Juverna," a ship in which some cases of cholera had occurred at night. He was taken ill with vomiting and purging

and was brought to the General Hospital on the morning of the 20th. The surface was livid, cold and damp, the pulse imperceptible, and the eyes sunken. Sinapisms were applied to the epigastrium; three acetate of lead pills were taken during the first three quarters of an hour, and brandy was exhibited. There was no recurrence of purging, but the collapsed state continued, and he died at 10 A.M.

Inspection five hours after death.—*Head.* The vessels of the pia mater and the sinuses were moderately congested with dark-coloured blood. There were between three and four ounces of serum in the cavity of the head, chiefly at the base of the skull.—*Chest.* The lungs were collapsed and not congested but were slightly emphysematous on their anterior edges. The left ventricle of the heart was contracted and firm, and the right contained dark-coloured blood partly coagulated.—*Abdomen.* There was a general blush of redness over the intestines. The ascending vena cava and the mesenteric veins were filled with dark-coloured blood. The glands of the mesentery were pale and soft, and ranged from the size of a pea to a large almond. The mucous coat of the stomach was marbled brown. The end of the ileum was laid open, and there was ramified vascularity underneath the mucous coat, which was studded with Peyer's glands, each about the size of a mustard seed and standing in prominent relief. The follicles in the transverse colon were large and their orifices distinct. The kidneys were healthy. The liver was pale.

88. *Cholera.*—*Drowsiness before Death.*—*Vessels of the Pia Mater turgid.*—*Two Ounces of Serum in the Cavity of the Head.*—*Villi of the Ileum; and the Follicles of the Colon were distinct.*

Robert Forrest, aged sixteen, a seaman of the ship "Competent," was taken ill with cholera on the night of the 17th May, 1839, and brought to the General Hospital at 6½ A.M. of the 18th. During the night, brandy and laudanum had been frequently given. Shortly after admission he passed a rice-water-like evacuation. The eyes were sunken, the pulse nearly imperceptible, and the cramps of the abdominal muscles and limbs were distressing. A large sinapism was directed to be applied to the abdomen; hot sand and friction to the extremities; an enema containing ten grains of acetate of lead was exhibited, and ten minims of liq. ammoniæ and two drachms of brandy were directed to be given every quarter of an hour.

At 8 A.M. he had been purged several times. The skin was damp and cold, the pulse imperceptible, the eyes sunken, and there was tendency to sleep. The sinapisms were repeated. One grain of acetate of lead and two of aromatic confection were given every quarter of an hour for four times, and then every half hour; brandy three drachms every quarter of an hour; and the ammonia was omitted. At 10½ A.M. four pills had been taken and one evacuation had been passed. The breathing was oppressed and there was tendency to sopor; the pulse was more perceptible. At 2 P.M. eleven doses of brandy had been taken. There was slight delirium, the pulse was perceptible, the medicines were omitted. He died at 4½ P.M.

Inspection fifteen hours after death.—The abdomen was distended and tense; putrefaction had commenced.—*Head.* The vessels of the pia mater were turgid. The substance of the brain when incised, presented many bloody points, and there were about two ounces of serum in the cavity of the head.—*Chest.*—There were old adhesions of the pleura of the right side. The lungs were collapsed and moderately congested behind. The heart was not flaccid or flabby.—*Abdomen.* All the intestines were distended with flatus. The stomach was distended. The mucous coat at the cardiac end was marbled brown, but it was healthy in texture. The end of the ileum was laid open. The villi were distinct, but the glands were not prominent. The mucous coat of the transverse colon was healthy, but the follicles were large, and their depressed orifices distinct. The liver gave out some fluid blood when incised. The kidneys were not congested.

89. *Cholera.*—*Drowsiness two Hours before Death.*—*The Vessels of the Pia Mater turgid.*—*Three Ounces of Serum chiefly at the Base of the Skull.*—*Glands of the Ileum and Follicles of the Colon distinct.*

Henry Victor, aged twenty-two, a French seaman, of sallow complexion, was taken ill on board ship with cholera on the 17th May, 1839, and took medicines. He was brought to the General Hospital at 6½ A.M. of the 18th. He was pulseless, the skin was cold and the eyes sunken. Heat and friction were applied to the extremities; a sinapism to the abdomen; and liq. ammoniæ m. x. brandy three drachms, water four drachms were directed to be given every quarter of an hour, and an enema with acetate of lead to be used, should there be recurrence of purging. At 8 A.M. he had passed two rice-water-like

dejections, and a pill was ordered, consisting of one grain of acetate of lead, two of aromatic confection, and a quarter of a grain of opium every half hour, and to be omitted after the fourth dose should the purging not recur; the ammonia was omitted, the brandy continued, and sinapisms applied to the feet, and liquor lyttæ rubbed freely on the epigastrium. At 10½ A.M. there had been no return of purging; and four pills and seven doses of brandy had been taken. The breathing was laboured, and coma was coming on. He died shortly after noon.

Inspection.—Body stout.—*Head.* The vessels of the pia mater were very turgid, and the substance of the brain when incised presented a pinkish and dotted surface. There were about three ounces of serum in the cavity of the head,—the greater quantity at the base of the skull, but that in the ventricles was increased and some of the convolutions of the convex surface of the brain were veiled.—*Chest.* The lungs were collapsed and not congested. The left ventricle of the heart was firm and contracted, the right flaccid and containing dark tarry-looking blood.—*Abdomen.* There was a general blush of redness over the intestines. The mesenteric glands were enlarged and ranged in size from a pea to a chestnut. The stomach was much distended with fluid ingesta. The mucous coat was natural in texture, but marbled red at the cardiac end. The small intestines contained much rice-water-looking fluid and one lumbricus at the end of the ileum. The lining membrane was coated with white mucus, was pale, the villi distinct, and the glands prominent. The descending part of the colon was much contracted. The mucous coat throughout the colon was healthy. The follicles with their depressed orifices were very distinct. The kidneys were not congested; and the spleen was healthy.

90. *Cholera.*—No Drowsiness noted.—*Vessels of the Pia Mater turgid.*—Between two and three Ounces of Serum, chiefly at the Base of the Skull.—*Glands of the Ileum and Follicles of the Colon distinct.*

Nana Falere, a French seaman, aged twenty, was brought to the General Hospital on the 17th May, 1839, at noon. It was stated that he had been seized with vomiting and purging that morning, and had taken calomel with laudanum and brandy. On admission, the skin was damp and cold and had a bluish tinge, the features were sunken and he was pulseless and restless. A sinapism was applied to the abdomen, and afterwards liquor lyttæ was rubbed on the epigastrium; heated sand was applied

to the lower extremities; dry friction of the chest and arms, and ten minims of liq. ammon. with two drachms of brandy were given every quarter of an hour. He did not rally in the least, and died at 4 P.M.

Inspection fifteen hours after death.—*Head.*—The vessels of the pia mater were turgid. There were two or three ounces of serum, chiefly effused at the base of the skull, and when the brain was incised the surface presented more than the usual number of bloody points.—*Chest.* The lungs were collapsed and moderately congested at their posterior part. The heart was flaccid, pale and soft in texture, and the cavities of the right side contained fibrinous coagula.—*Abdomen.* There was a general rosy blush over the peritoneal lining of the intestines. The liver, when incised, gave out fluid blood. The mucous coat of the stomach was covered with a layer of mucus and presented a rosy tint. Four feet of the small intestines from the end of the ileum upwards were laid open. The mucous coat was pale and milky, the villi distinct, and the surface was studded with isolated glands, many of them as large as a mustard seed, and standing out in relief, but quite pale in colour. The aggregated glands were also prominent, and, on holding the intestine to the light, vessels were seen ramifying under the mucous coat. The transverse colon was laid open. The follicles were moderately distinct but not very prominent. The mucous coat was healthy. The kidneys were congested.

91. *Cholera.*—*The Glands at the End of the Ileum and the Follicles of the Colon were distinct.*

Charles Griffith, aged twenty-four, second mate of the ship "Competent," was taken ill with cholera on the morning of the 16th May, 1839, was brought to the General Hospital at 6 P.M., and died half an hour after admission.

Inspection fourteen hours after death.—*Head.* There was considerable turgidity of the vessels of the pia mater; and when the brain was incised, the surface presented a general rosy tint, with numerous bloody points. There were about two ounces of serum, chiefly effused at the base of the skull.—*Chest.* The lungs were collapsed, but congested with blood at their posterior part. The heart was flaccid and soft.—*Abdomen.* There was a general blush of redness over the intestines and omentum, and some of the large veins of the mesentery were moderately congested. The liver was not enlarged, but gave out much blood when incised. The mucous glands of the pyloric end of the

stomach were distinct. The whole tract of the intestine was laid open. The small intestine was filled with rice-water-looking fluid. The mucous coat of the duodenum and jejunum was of a milky colour and the villi were very distinct. Throughout the ileum the isolated and aggregated Peyer's glands were distinct but of pale colour. Towards the end of the ileum there was ramified congestion underneath the mucous coat. The large intestine was contracted, the follicles distinct and pale, but the mucous coat healthy in texture. The kidneys were congested.

92. *Cholera.*—*Drowsiness; Vessels of the Membranes of the Brain turgid.*—*Follicles of the Colon distinct.*

Cornelius Henderson, aged nineteen, seaman in a ship in which several men had died of cholera, was brought to the General Hospital on the 1st September, 1839, at 10½ A.M. The skin was damp, pulse feeble and compressible, voice feeble, eyes sunken. He seemed drowsy and complained of headache. He stated that he had been affected with vomiting and purging for two days, and had taken medicines. One acetate of lead pill was directed every hour for three doses, should the purging not recur, and was then to be continued every second hour; fomentation to the abdomen; and a blister to the nucha. At one and a half P.M. three pills had been taken, and he had vomited several times, and been purged twice, the evacuations watery and greenish, the pulse had sunk much, the skin was damp, and there was lividity of the surface. He wished much for beer. A blister was applied to the epigastrium, the pill continued every second hour, and beer one ounce and a half, and brandy six drachms every hour. Common salt one ounce, carb. sodæ one ounce, hot water (at temp. 120°) one pint, were used as an enema every half hour. Five P.M. Five enemata had been used; two pills had been taken, and the beer and brandy given seven times. He had vomited frequently after ingesta. The enemata had been all returned, but there had been no other purging. The pulse was now quite imperceptible, the skin livid, damp and cold, the breathing oppressed, the thirst and restlessness incessant. The blister on the epigastrium had not risen, but that on the nucha has. Omit medicament: continue the beer and brandy. He died at 6 P.M.

Inspection fourteen hours after death.—Chest, narrow; body slight.—*Head.* The vessels of the membranes and the sinuses were turgid with dark-coloured blood, and the substance of the

brain when incised was dotted with bloody points.—*Chest.* The lungs were emphysematous and did not collapse, but were not congested either with serum or blood. The cavities of the right side of the heart were full of fluid blood.—*Abdomen.* There was a general blush of redness over the peritoneal surface of the intestines, and many of the mesenteric glands were white, and as large as a horse-bean. The mucous coat of the colon was studded with follicles, the orifice of each generally distinct. At the end of the ileum there was passive vascularity of the mucous coat, but the isolated and aggregated glands were not very prominent. The mucous coat of the stomach was coated with glairy mucus. The spleen and liver were not congested.

93. *Cholera.*—*Effusion of Serum in the Head; no Head Symptoms.*—*Peyer's Glands distinct.*

William Wilde, age forty-nine, a seaman, was admitted into the General Hospital at 10 A. M. of the 26th June, 1839. It was stated, that he had been ill with purging and cramps during the previous night. On admission the skin was cold, the pulse almost imperceptible, and abdomen full. A warm bath was ordered and followed by sinapisms to the epigastrium and frictions to the extremities; a pill of acetate of lead was directed to be given every hour, and three drachms of brandy every half hour. At 1 P. M. three pills and six doses of brandy had been taken, and the skin was warmer, and the pulse more perceptible. But, he was thirsty and restless, the respiration was laboured, and three rice-water-like stools had been passed. The pills were directed to be given every half hour, and the brandy every hour. At 4½ half P. M. there had been no recurrence of purging, the pulse was just perceptible, the skin was damp, thirst urgent, and the breathing laboured. Sinapisms were applied to the feet; the brandy was directed to be continued, and the pills to be omitted. He died at 10 P. M.

Inspection ten hours after death.—*Head.* The convex surface of the brain was partially veiled by effusion of serum, and the lateral ventricles were somewhat distended.—*Chest.* There were old adhesions of the left lung, but the viscera were otherwise healthy.—*Abdomen.* The viscera were generally healthy, and without much congestion. The end of the ileum and the colon were laid open; in the former the isolated glands and groups were distinct and elevated. The follicles of the colon were not distinct, and the mucous coat was natural in texture, with dark brown and red patches here and there.

94. *Cholera.*—*Peyer's Glands in the Ileum and Follicles of the Colon distinct.*

Alexander Bolton, aged fourteen, an Indo-Briton, was admitted into the sick ward of the Byculla schools on the 20th July, 1839, at 4 P. M. in the collapsed stage of cholera. It appeared that he had ailed in the early part of the day with vomiting and purging, but had not complained. On admission, cholera mixture was exhibited, followed by stimulants, sinapisms, and external heat. Four acetate of lead pills were also given. The purging ceased, but the collapsed state continued, and he died about eight P. M.

Inspection twelve hours after death; conformation slight.—*Head.* The vessels of the membranes and of the substance of the brain were considerably congested with dark-coloured blood; and there were two ounces of serum at the base of the skull.—*Chest.* The lungs were collapsed, and not congested posteriorly more than is usually observed. The cavities of the heart were empty.—*Abdomen.* There was a blush of redness over the external surface of the intestines. The small intestine contained fluid. The colon was rather contracted. The mesenteric glands were generally enlarged, and ranged in size from a horse-bean to an almond, but there was no degeneration of structure. The liver was healthy. The stomach was filled with the ingesta taken before death. The mucous coat was lined with glairy mucus, and there were patches of the tunic tinged of a leaden grey colour. The beginning of the jejunum, four feet of the ileum, and the colon were laid open. In the small intestine the villi were very distinct. The isolated glands and the patches at the end of the ileum were very prominent; some of the latter were pale, others dotted dark red, and here and there were patches of ramified redness underneath the mucous coat. The follicles of the colon were distinct throughout; the mucous tunic was pale. The contents of the intestines were milk white and of moderate consistence from intermixed mucus.

95. *Cholera.*—*No Enlargement of Peyer's Glands in the Ileum.*—*Enlargement of the Mucous Follicles of the Colon.*

James Copper, aged thirty-nine, of feeble and emaciated habit, after having suffered two or three days from diarrhœa, was admitted into hospital on the 14th March, 1840, ill with cholera, and died at 11 A. M. of the 15th.

Inspection.—*Head.* The vessels of the brain were congested with dark blood; and the substance, when incised, showed bloody points.—*Chest.* The lungs were quite collapsed. The cavities of the heart, and chiefly those of the right side, were full of dark-coloured fluid blood.—*Abdomen.* The liver was of natural size, and mottled in texture. The gall-bladder was full of bile. There was a blush of redness over the intestines. The mucous coat of the stomach was of rosy tint; but the texture was sound. The inner surface of the small intestine presented throughout a blush of redness deeper and more arborescent towards the end of the ileum. There was very little prominence of the solitary glands, or of Peyer's patches. The contents of the small intestine were thin, grey, and without adhesiveness. The mucous follicles throughout the colon were distinct, and the tunic was sound in texture.

96. *Cholera.*—*The Stomach much distended.*—*The Villi of the Mucous Membrane of the Ileum very distinct.*

William Taylor, aged thirty-nine, a man of broken constitution, an Indo-Briton, and out of employment, was admitted into the hospital on March 19th, 1840, in the advanced stage of cholera. He died at midnight.

Inspection.—The body was emaciated.—*Head.* There was considerable congestion of the vessels of the membranes and of the substance of the brain. There was a veil of serum on the convex surface of the brain, and about an ounce at the base of the skull.—*Chest.* The lungs, moderately collapsed, were somewhat congested with blood at their posterior parts. The coronary vessels of the heart were turgid with blood; and the cavities of the right side of the heart were distended with dark fluid blood.—*Abdomen.* There was a blush of redness over the omentum and peritoneal coat of all the intestines. The stomach, much distended, filled the left hypochondrium, the epigastrium, and part of the right hypochondrium, and pushed the liver within the arch of the ribs. No distention of the intestines. The mucous coat, at the end of the ileum, presented a rosy tint, and the villi, but not Peyer's glands, were distinct. The mucous coat of the colon was pale, and the follicles not apparent. The mucous coat of the stomach was much mammellated and thickened, but pale in colour.

97. *Febrile Symptoms with Diarrhœa ending in Cholera.*
—*The Lungs contained Miliary Tubercles.*—*The*

Mesenteric Glands and the Follicles of the Colon distinct.—Serum in the Cavity of the Cranium.—No Head Symptoms.

The chief officer, aged thirty-three, of a ship in which several cases of cholera had occurred, was admitted into the General Hospital on the 23rd May, 1839. He was of spare habit, and stated that for several days previously he had suffered from diarrhœa. Calomel and opium were given, and on the following morning castor oil with laudanum and peppermint water. On the evening of the 23rd, there was slight heat of skin and the bowels had not been freely moved. Four grains of calomel and six of Dover's powder were given at bed-time and castor oil one ounce the following morning. On the morning of the 24th, there was still slight heat of skin. At the evening visit there was complete apyrexia, and the bowels had been freely moved. On the morning of the 25th he was directed to take quinine, chalk and mercury, of each two grains, opium quarter of a grain, with aromatic confection, thrice in the course of the day. At the evening visit the bowels continued relaxed, and the quinine and chalk and mercury were directed to be given, with one grain of opium, at bed-time. He was very frequently purged during the night, the evacuations being copious, watery, and tinged green. On the morning of the 27th (full moon), the pulse was feeble, the abdomen collapsed, tongue pretty clean. One acetate of lead pill was directed every hour, till four were taken, and sago was given with wine. At 10½ A.M. he had taken three pills and been purged twice, and had vomited once. Contin. At the evening visit, eight pills had been taken and three ounces of wine. There had been five or six watery evacuations, the skin was covered with cold perspiration, the pulse was feeble and the countenance more collapsed, tongue dryish. A large blister was applied to the epigastrium, and two drachms of brandy given with hot water every half hour, and the pills were omitted. At 9 P.M. the skin was not so damp or cold, seven doses of brandy had been taken; pulse was more frequent, there had been five or six green watery stools. An enema of six ounces of rice conjee, with ten grains of acetate of lead and one drachm of tincture of opium, was directed to be given; and the brandy to be continued every second hour. During the night there were several watery evacuations, and on the morning of the 28th, the blister was found to have risen well. The skin was damp, the pulse feeble, there was much thirst, and the tongue was dryish. The acetate of

lead enema was repeated, and quinine and aromatic confection, each two grains, with opium quarter of a grain, were directed to be given every four hours, and the brandy was repeated. The purging continued to recur; and he died at 5 A.M. of the 29th.

Inspection four hours after death.—*Head.* There was a layer of serum between the arachnoid membrane and pia mater on the convex surface of the brain, and the blood in the large veins was very serous. There was about an ounce of serum at the base of the skull.—*Chest.* The lungs collapsed; their anterior aspect was pale, and there was a good deal of emphysema on the surface and at the edges. Miliary tubercles were scattered here and there in the upper lobes, more in the left than in the right lung. A few of the tubercles were as large as a pea and the intervening pulmonary parenchyma was healthy. The heart was healthy.—*Abdomen.* The liver was healthy. The stomach small and contracted. The whole tract of the alimentary canal was laid open. The small intestine was filled with light yellow flocculent mucus. The mucous coat was in its natural state; and Peyer's glands at the end of the ileum were not prominent. There was dilatation of much of the upper part of the small intestine. The mucous coat of the colon was studded with distinct follicles. The descending colon was contracted. The kidneys were healthy. Many of the mesenteric glands were as large as horse-beans.

98. *Cholera.*—*Symptoms coming on in the Course of Fever.*—*Drowsiness during the last Day.*—*Moderate Turgescence of the Vessels of the Membranes.*—*Two Ounces of Serum at the Base of the Skull.*

Sarah Duff, an Indo-Briton, aged eight. Had been the subject of frequent attacks of porrigo of the scalp, but for some months before the illness about to be described, she had been completely cured of that affection and the hair had grown. On the 9th July, 1839, it was reported that she had been feverish for some days, and that the tongue was furred. Calomel gr. iv. were given to be followed by an ounce and a-half of senna mixture. On the 10th the medicine, not having acted, was repeated, operated once freely; and at bed-time she was free of fever, and without complaint. In the course of the night she was seized with vomiting and watery purging followed by collapse. Calomel and opium were given, and sinapisms were applied to the abdomen. At 10 A.M. of the 11th, the skin was cold and

damp, the features sunken, the pulse imperceptible, tongue furred, and there was much restlessness. The vomiting and purging had ceased. Ten minims of liquor ammoniæ with four drachms of water were given every hour, and wine, with thin arrowroot, occasionally. During the 11th she vomited frequently; continued little changed. On the 12th and 13th she had rallied slightly. On the 14th there was drowsiness, which increased on the 15th, but not to coma. She died at 4½ P.M. on the 15th. The treatment during these days consisted of stimulants, quinine, counter-irritants, such as rubbing the scalp freely with tartar emetic ointment and blistering the epigastrium.

Inspection fourteen hours after death.—*Head.* There was moderate turgescence of the vessels of the membranes of the brain, and about two ounces of serum at the base of the skull.—*Chest.* There were old adhesions of the third lobe of the right lung. But both lungs, with exception of white spongy emphysema, were healthy.—*Abdomen.* The mucous coat of the stomach was reddened in places but firm in texture. That of the end of the ileum and beginning of the colon was much thinned and somewhat softened; here and there, there were red patches. The liver was healthy. There was a duplicature downwards of the middle of the transverse colon.

99. *Pleuritic Effusion.*—*Ascites.*—*Access of Cholera.*
—*Disappearance of the Dropsical Effusions.*—*Bright's Disease of the Kidney and Tubercular Peritonitis found after Death.*

Mooburick Nuseeb, an African, of fifty-eight years of age, was admitted into the clinical ward on the 10th of September, 1849. He was somewhat emaciated; the abdomen was swollen, tense, and fluctuating, and somewhat tender on pressure. On the left side of the chest there was dulness on percussion below the level of the third rib, varying with change of posture, accompanied with absence of vocal thrill, and the heart's impulse most distinctly felt to the right of the sternum. There was no febrile disturbance observed, but he complained of nausea and abdominal distension and discomfort after eating. The pulse was small, of natural frequency. The tongue not coated, but somewhat florid at the tip, and the bowels occasionally relaxed. He stated that he had been ill fifteen days, and that the uneasiness and fulness of abdomen had come on gradually during that period. On the 15th and 19th the urine was examined; its

specific gravity was about 1020, and it gave no traces of albumen under heat and nitric acid. On the 20th, the occasional diarrhoea from which he had suffered since admission, passed into distinct cholera, and he died on the 26th. The rice-water-like discharges continued more or less abundant till the 23rd. The pulse became feebler, but remained distinct till shortly before death. The surface of the body was sometimes cold, at others regained its natural temperature. The urine was passed scantily on the 23rd and 25th. Drowsiness first showed itself on the evening of the 21st, and he became quite comatose before death. On the 21st the fulness and tenseness of the abdomen were much lessened; the thoracic dulness extended no higher than the fifth rib, and the heart's impulse was less to the right of the sternum. On the 25th the abdominal fulness and the thoracic dulness had almost altogether disappeared, and the heart's impulse was most distinct between the third and fourth ribs of the left side, an inch from the margin of the sternum.

Inspection twelve hours after death.—*Chest.* There was not any serous effusion found in the sac of the left pleura. The left lung was soft and crepitating, and in no respect compressed. There were two or three bands of firm adhesion connecting the inner surface of the lung to the pericardium. The right lung was also soft and crepitating, and connected by means of old adhesions to the costal pleura. There were no traces in the costal or pulmonary pleura of recent inflammatory action detected. A larger than normal portion of the heart was to the right of the mesial line. There were opaque patches here and there on the surface of the heart. A slight degree of dilatation of the left ventricle, and of thickening of the mitral valve, was observed; right ventricle, natural, and the aortic valves of natural thickness. *Abdomen.*—The whole of the peritoneal covering of the anterior parietes was closely beset with granular deposits, each granule was about the size of a small pin's head. Similar deposit was also present on the peritoneal surface of the intestines. The convolutions of the intestines were closely and firmly adherent to one another, and, in places here and there, to the anterior parietes chiefly below the umbilicus. The concave surface of the liver adhered to the stomach, and to the hepatic flexure of the colon, and also by old and firm adhesions to the diaphragm. There was no serous fluid found in the cavity of the abdomen. The liver was harder than natural, resisting to the knife and granular.—The left kidney was considerably enlarged and flabby; when incised the surface showed, chiefly in the body of the organ, considerable encroachment on the

tubular portion by a pale buff finely granular structure. The external surface, on removing the capsule, presented a finely mottled appearance (red and yellow). A similar state of the right kidney was present, and in greater degree. The *Head* was not examined.

Remarks.— This case occurred at a time when cholera was prevalent. It presents several points of considerable interest. The abdominal effusion, coexisting with a pleuritic effusion, was due in all probability to the kidney disease, not to the pre-existing, and probably not recent, tubercular peritonitis. The incomplete collapse, and the long course of the cholera attack, are to be attributed to the replacement, from the pleuritic and abdominal effusions, of the water of the blood lost in the intestinal discharges. It shows that endosmosis and exosmosis may go on freely from a serous surface studded with grey granular deposit. It is an instance of this deposit present in the peritoneum, but absent in the lungs.

CASES FATAL FROM SECONDARY INFLAMMATIONS.

100. *Cholera.*—*Recovery from the Stage of Collapse.*—*Head Symptoms.*—*Death by Coma.*—*Thickening and Opacity of the Arachnoid.*

William Scott, aged thirty-two, seaman of the barque "Ritchie," was taken ill on the morning of the 5th of June, 1842, with symptoms of cholera, and was admitted into the General Hospital at 6 P.M. The state of collapse was considerable. The occasional purging of rice-water-like dejections, but with a gradually improving pulse, continued during the 6th and 7th. He was treated with pills of camphor and blue pill, or Dover's powder and calomel, or hydrarg. c. cret. On the 8th the gums were reported to be somewhat swollen, the dejections still pale in colour, and at the evening visit a want of alertness of manner was for the first time noted. A full dose of calomel was given. On the 9th defective secretion of urine was noted. During the 10th, 11th, and 12th the drowsiness increased; the tongue became dry in the centre; there was occasional vomiting and hiccup. The excretions from the bowels scanty. The pulse and skin, however, were not much affected. No urine was passed, but the catheter was used several times, and at each a pint or two of urine was drawn off. Blisters were applied to the epigastrium and nucha; ol. ricini and ol. terebinth. were

exhibited. On the 13th and 14th the drowsiness increased with muttering delirium, and oppressed breathing, and the pulse lost strength. He died at 5 A.M. of the 15th.

Inspection.—Head. There was vascularity of the pia mater; thickening and general milky appearance of the arachnoid membrane, with opaque points here and there. There was about an ounce of slightly turbid serum in the lateral ventricles.—*Chest.* The lungs collapsed, but there was œdema of the posterior parts without hepatization. The heart was healthy.

101. *Cholera, Collapse recovered from, followed by Pneumonia and Pericarditis.*

Robert Morrison, aged forty-three, seaman of the barque "Barbara," was admitted into the General Hospital at 11 A.M., of the 2nd June, 1842, having been taken ill in the course of the night with symptoms of cholera. The symptoms were not urgent, and after rallying from the state of collapse, on the 3rd he complained of an uneasy load at stomach, and on the 4th of pain of chest. On the 5th the pain of right mammary region was acute. He was leeches, and antimonials were exhibited. On the 6th the pain was nearly gone, but towards evening it had become aggravated, and was attended with short cough; a blister was applied, and the antimonials continued. On the 7th, 8th, and 9th, he complained chiefly of weakness, and on the last day there was considerable dyspnœa. He died on the 10th.

Inspection five hours after death.—Chest. The right lung was throughout completely solidified, being in a state of red hepatization, and when incised giving forth much blood-tinged serum. The pericardium contained several ounces of sero-puriform fluid; the surface of the heart, and inner surface of the pericardium, were coated with a thin granular firm layer of lymph.

In cases of cholera fatal in the secondary stage, the morbid appearances found after death are the results of inflammatory action in the structures which have been chiefly affected during life.

The chemistry of the alvine discharges and of the blood in cholera, has been a subject of inquiry with many observers; but as yet these researches have done little more than confirm and give precision to infer-

ences already fairly deducible from clinical observation and morbid anatomy.

According to Dr. Parkes' observations*, there are in 1000 parts of cholera evacuations, water, 987·95, organic matter and insoluble salts, (earthy phosphates), 3·9, soluble salts, (chlorides, phosphates, and sulphates of soda and potash), 8·1. The same careful inquirer has particularly noted the small amount of organic extractions in the discharges of cholera, and he believes that this circumstance indicates the suspension during the collapsed stage of cholera of the proper excreting functions of the intestinal mucous membrane. I need hardly remark that this belief is quite in accordance with clinical inferences relative to the general vital actions of the system in this stage of the disease.

The density of the blood is necessarily much increased in consequence of the transudation from the vessels and discharge from the bowels of so much of its watery constituent. The degree of increase of density will have relation to the duration of the attack, the amount of transudation, and the absence of replacement of water. It need hardly be observed, that the loss of the water of the blood does not merely affect the constitution of the liquor sanguinis, but must also, in accordance with the laws of endosmosis and exosmosis, influence that of the contents of the blood corpuscles. The proportion of the inorganic salts of the blood would seem to be increased in the early stages of the disease in consequence of the greater proportional transudation of the water. But in the more advanced periods the salts gradually sink below their normal proportion.†

* Report on the Morbid Anatomy and Pathology of Cholera, pp. 25. and 26. by Dr. Gull.

† Dr. Gull's Report, p. 45.

Dr. Garrod* thus states the conclusion which may be drawn from his experiments in respect to urea in the blood in cholera: "That urea usually exists in increased quantities in cholera blood, but that the amount differs considerably in the different stages of the disease; being but small in quantity in the intense stage of collapse, increasing during re-action, and in excess when consecutive febrile symptoms occur."

This statement,—that urea is present in the blood in small quantity in the intense stage of collapse, increased with reaction, and is in excess when consecutive febrile symptoms occur,—quite accords with the general tenour of the remarks, based on clinical observation alone, which I have already made relative to the import of the absence of the urinary secretion in cholera.

SECTION IV.

TREATMENT IN RELATION TO THE DIFFERENT DEGREES AND STAGES OF THE DISEASE. — ILLUSTRATIVE CASES.

IN the remarks which I have to make on this subject, I shall confine myself to a statement of the conclusions to which I have been led by reflection, and the clinical observation of cases not only immediately under my own care, but also of those treated by others in the same or different hospitals. I place the more confidence in the opinions which have thus been formed, and which some years ago have been in part elsewhere expressed, because they rest on principles very similar to those entertained by some of our latest and best writers † on this disease.

* Dr. Gull's Report, p. 53.

† Chapter on Treatment in Dr. Parke's *Researches into the Pathology and Treatment of Cholera*; also Dr. Gull's Report on the *Treatment of Cholera*.

Extensive clinical acquaintance with epidemic cholera leads the unbiassed mind to this conclusion. That there are degrees and stages of cholera as of other zymotic diseases, which are beyond the direct resources of medical art, and that in the management of these the physician best consults the interests of humanity and the character of his profession, when he abstains from rash and restless empiricism, and is satisfied with placing the patient in those circumstances most favourable for the revival of vital action, under the influence of their ordinary stimuli. That on the other hand, there are degrees and stages of the disease which are frequently readily controlled by medicine, and that these demand careful study and attention. Guided by these principles, I proceed to the consideration of the treatment of cholera.

The prevalence of diarrhœa in seasons of epidemic cholera, obtains in India as well as in European countries; but I believe that this event is more common in the latter than in the former. The relation, however, which these two affections bear to each other is the same in both countries. The diarrhœa, if neglected, is very apt to pass into cholera; and on the other hand, it is amenable to ordinary treatment in a large proportion of cases. We may express these facts in other words by saying cholera is not unfrequently preceded by a premonitory, and often readily curable, diarrhœa. The practical rule of carefully regarding and treating all cases of diarrhœa, and of being very cautious in the use of purgatives, antimonials, or other intestinal irritants, in the general treatment of disease, in cholera seasons, is very familiar to the experienced practitioner in India. And there can be no doubt that by its observance there has been often much saving of life. It has for many years been the

judicious practice of the authorities in Bombay, in seasons when cholera is epidemic, to station qualified individuals, with suitable remedies, in the different divisions of the native town, and to encourage those affected with diarrhœa to apply for relief.

The remedies which have been used for this premonitory diarrhœa are numerous; but in natives or Europeans who have been long resident in India, a simple opiate is the best means we can adopt. One or two grains of solid opium, or from twenty to forty minims of the tincture, with peppermint water, and two or three drachms of brandy, may be given. If the diarrhœa has been early noticed, and if at the same time diet, and the temperature of the surface of the body, have been carefully attended to, a single dose of opium will very generally suffice. Should such, however, not prove to be the case, then after a suitable interval a smaller dose may be repeated.

In sthenic Europeans in India, in whom this premonitory diarrhœa frequently coexists with a coated tongue, it is advisable to combine the opium with calomel, in the proportion of two grains of the former to ten of the latter. This course is followed, not so much on account of any direct expected benefit from the calomel, as on the supposition that it modifies or prevents the astringing effect of the opium on the biliary excretion.

In cases in which the diarrhœa has been neglected, and allowed to continue for some time unchecked, in which the discharges are becoming very watery, and the pulse and countenance beginning to change, then attention to such adjuvants as confinement to bed in the recumbent posture, and warmth by suitable clothing to the surface of the body, must at once be enforced;

while at the same time the opiate remedies are given and repeated, combined with a larger proportion of alcoholic or ammoniated stimulant.

Should such means, however, used under these circumstances, fail in speedily checking the diarrhœa, and should the true cholera discharges not as yet have been established, then we are no longer to trust to opium alone, for it will prove inefficacious in small doses, and injurious in large ones frequently repeated. Recourse must be had to astringent remedies given more or less frequently, either alone or combined with small doses of opium. Acetate of lead, diluted sulphuric acid, preparations of kino or catechu, gallic acid, with many others, may be named. The first* is the astringent of

* I have always used the formula recommended by Dr. Graves, from whose writings I adopted this system of treatment, viz. "a scruple of acetate of lead combined with a grain of opium, and six grains of powdered liquorice made into a mass with mucilage, divided into twelve pills."

In the year 1839, I published in the second number of the Transactions of the Medical and Physical Society of Bombay cases of cholera treated with acetate of lead, after the manner recommended by Dr. Graves. They seemed to me favourable. Further experience led me, in the seventh number of the Transactions of the Society, in 1845, to write in a more qualified manner. Again, after my experience in the Jamsetjee Jejeebhoy Hospital, I expressed myself in the tenth number of the Transactions, p. 323, in 1850, to the following effect :—

"In the Transactions of the Medical and Physical Society I have expressed my opinion on the efficacy of the acetate of lead, if given while the pulse is of tolerable strength, also of its inapplicability to those extreme cases of the disease in which great collapse follows trifling discharges ; and I would now add, as the result of my experience in this epidemic, that the acetate of lead has proved altogether powerless in restraining the serous discharges occurring after collapse has fully set in. Whether an attempt to restrain these discharges after fully formed collapse has taken place is an indi-

which I have had the greatest experience, but I have no great bias in its favour, and would prefer any of the others, if, as is very probable, they are of equal efficacy.

But should the symptoms still continue, and the diarrhœa pass into cholera, and collapse be more or less established, then the principles for the treatment of this stage of cholera, which I shall presently explain, must be observed.

After these few remarks on the treatment of, and the importance of attending to, the diarrhœa prevalent at cholera seasons, I proceed to consider the management of the disease after it has become fairly developed. And here it is necessary, in the first instance, to state certain principles which I believe to be true, and to which I have been led chiefly by clinical research.

1. In the collapsed stage of cholera, the capillary circulation, and the processes in which it is concerned, are in a great measure suspended; hence there cannot be absorption or action of medicinal agents.

2. In cases in which the collapsed stage is recovered from, the return of the general and capillary circulation, and consequent vital processes, is gradual and slow, and more likely to be disturbed than aided by medicines; while at the same time the gastro-intestinal mucous

eration to be kept in view, is probably an open question in the pathology of the disease, which need not be discussed here. The acetate of lead, however, has been inefficacious for the purpose, and I should be indisposed again to have recourse to it under the same circumstances of the disease; the more so, as it is possible enough that the drug lying dormant and inert in the alimentary canal during the period of collapse may have an injurious influence by its rapid absorption, on the occurrence of reaction." My present opinion, then, is not corroborative of the estimate entertained by Dr. Graves of the value of this medicine in cholera, and the above statement will show that it has not been hastily formed, but is the result of upwards of fifteen years' attention to the question.

membrane is very predisposed to take on inflammatory action.

3. Medicinal agents given in the stage of collapse and not at that time absorbed, are liable to accumulate in the intestinal canal, to become absorbed as reaction is re-established, and then to interfere with the restoration of secretion and other functions; or they may, by their mere presence, act as irritants on the predisposed mucous surface, and excite gastro-enteritis.

In the first and milder degree of cholera, described at page 369.—in which, though the cholera discharges are present, the pulse is still of moderate strength,—it is not improbable that some degree of absorption may be carried on at the intestinal surface, and that therefore there may be indication for the use of remedies. It is right to act cautiously on this probability; but, with every allowance for it, my belief still is, that when cholera discharges are fairly established, they are, whatever the state of the circulation may be, very little under the control of astringent or other remedies.

In my further remarks on treatment, I shall assume that the reader bears in mind not only the statement of principles which has just been made, but also the degrees of the disease as already explained in connexion with the symptoms.

When cases of cholera come under treatment with the pulse distinct, then the remedies recommended for the treatment of the preliminary diarrhoea may be used. We must be careful, however, not to give more than one or two* full doses of opium; for this will be test sufficient of its efficacy, and more will be likely to prove injurious. If the collapse increases and the pulse becomes indistinct,

* I assume, of course, that opiates have not been previously given at earlier stages.

or if, after four or six hours of the use of astringents, the discharges persist unchecked, we shall do well to discontinue these remedies even though the pulse is still distinct; under both circumstances a fair trial of them will have been made. From the want of success, we are justified in inferring that the state of the system has not been compatible with the action of the medicines; and in apprehending that, by their further continuance, we may incur the subsequent risks attendant upon their accumulation.

A considerable proportion of the cases of the first degree of the disease,—those in which, after three or four hours of characteristic vomiting and purging, the temperature of the skin remains still good and the pulse of tolerable strength,—will do well under this treatment without any material augmentation of the state of collapse.

It was in this form of the disease—common in the early epidemics in India, but rare in later years—that general blood-letting and repeated doses of calomel and opium acquired a fame as therapeutic means which subsequent and more general experience has not confirmed. The truth, I believe, to be simply this,—that when the degree of the disease is such as to stop short of any considerable amount of collapse, then attention to the recumbent posture to warmth of the surface of the body by suitable coverings and the exhibition of a full opiate with or without calomel, according to the state of the tongue, are means sufficient for the cure. That more than this is not only in general unnecessary, but likely to be injurious rather than beneficial.

But, as already stated by me, a large proportion of the cases in Indian epidemics are of those degrees in which collapse, complete or great, comes on more or

less quickly. In these the skin is cold and damp, the pulse thready or imperceptible, and the features shrunk. When these symptoms are present—it matters not whether they have come on quickly or slowly, or whether treatment has been previously followed or neglected, or whether the discharges continue or have ceased—the period for the exhibition of opiates or alteratives or astringents has passed; the condition of the system is incompatible with their action.

We shall best manage this state of the disease by directing our attention to those ordinary stimuli necessary to the maintenance of vital actions in health, and to their restoration when depressed. The patient should be placed in a well-ventilated room*; the surface of the body should be wiped from time to time, lightly covered with two or three blankets, over which warm bricks, or other similar means of imparting external heat, may be applied. Water should be given frequently in small quantities, according to the desire of the patient, if he is alert; or it should be offered to him if he is sluggish and apathetic. It has been my practice, in addition to these means, to give a drachm of aromatic spirit of ammonia every hour or second hour, and a little wine with thin sago every third hour. It is, I think, well to assume the possibility of some degree of absorption, and to regard it to this extent. A recumbent posture should also be strictly observed. The cramps and restlessness, if distress-

* I would remark of cholera, as I have already done of remittent fever, that when requested by the graduates of the Grant College to visit with them in private, patients ill with cholera, I have been painfully impressed with the disadvantages under which they are required to treat the disease from the defective sanitary arrangements of native houses, and the injudicious crowding of anxious relatives and friends in the sick-room.

ing, may be palliated by gentle rubbing and shampooing.

The proportion of recoveries from the stage of complete or great collapse is considerable, certainly not less than 40 per cent. But I believe that if, in its management, the attention of the practitioner were confined to carefully carrying out the simple indications just explained, and not distracted with the vain hope of benefit from empirical experiments, that the mortality in this stage would be still further reduced. Of the cases in India, which recover from the state of collapse, the larger proportion is restored to health by a gradual return of the functions to their normal condition. The remainder are more or less exposed to the risks of secondary fever or inflammation, and in some of these there is a fatal issue. Though my impression,—that by treating the stage of collapse in the manner now recommended, we are likely to increase the number of recoveries from that state,—may admit of doubt, still I am very confident that, by abstaining from the use of opiates, astringents, alteratives, excessive stimulants, &c., in that stage, we materially lessen the proportion of subsequent secondary risks, and, consequently, diminish the absolute mortality of the disease.

We have now to follow the treatment when collapse is passing away and reaction is taking place. I shall notice, first, those cases in which there is gradual restoration of function without febrile excitement or secondary inflammation. When writing on the treatment of cholera in the European General Hospital in 1845, I made the following observations* :—

“The most satisfactory recoveries which I have witnessed from states of extreme and almost hopeless collapse—the

* Transactions of Medical and Physical Society of Bombay, No. vii. p. 192.

purgings having in great measure ceased—have been under the use of camphor and blue pill, in doses of three grains of the former and two of the latter, given every second or third hour, with effervescing draughts, light nourishment, and occasional stimulants.

“In successful cases, when the collapse is passing off, and the indication of cure is to restore the secretory functions which have been paralysed, I am clearly of opinion that this, in most cases, can be most satisfactorily effected by combinations of camphor, or quinine, and blue pill; perhaps calomel in small doses, with or without a small addition of opium, according to circumstances, and accompanied with the occasional exhibition of effervescing draughts, or small doses of castor oil. This course seems to me safer than to attempt the same indication by calomel in large doses and purgatives; it being probably more in accordance with the operations of nature. For it seems a fair assumption that functions having been completely checked, will be more likely to recover their natural course by degrees; and that, consequently, the indication seems rather gently to guide, than to attempt by strong measures to propel.”

In the ten years which have elapsed since these remarks were written, my opportunities of treating cholera, and of witnessing the treatment by others, have been extensive; but my principles have undergone very little change. If the recovered cases of cholera, which are presently to be narrated, be carefully considered, it will be observed that not unfrequently twenty-four hours after return of pulse and warmth of the surface have elapsed before the urine has been restored, or the alvine discharges become coloured. Such cases prove that these processes return to their normal condition slowly and gradually, and that, if we use active alteratives and eliminants, we are more likely to cause harm than good. Again, cases from 107. to 113. show that calomel may, under these circumstances, be given in considerable doses, and yet not exercise any perceptible effect on the biliary secretions; while, at the same time, its irritant action on the gastro-intestinal surface

may be suspected. From such cases we may draw the inference, that for some time after the commencement of reaction the secretory processes are not readily susceptible of influence from alterative or eliminatory remedies, and that, therefore, when we use them, we incur the hazard of gastro-enteric irritation without the counterbalancing advantage of favouring the restoration of the secretions. It follows, from these present observations, that, in my remarks of 1845, I attached an importance to the combination of blue pill with camphor and quinine to which I now believe it is in no respect entitled. My present opinion is, that the recoveries would have taken place equally well under the use of occasional effervescing draughts and diluents, light nourishment and occasional stimulants, if indicated by the state of the pulse, and that, by the needless use of mercurials and purgatives, restoration is delayed, and gastro-enteric irritation is apt to be excited. In individuals asthenic before the attack, it will sometimes be of advantage to give small doses of quinine every third or fourth hour; and it will be very necessary in such cases to pay much attention to frequent and appropriate nourishment; for asthenic individuals recovered from collapse are liable to sink unexpectedly from subsequent exhaustion. Occasionally, after the re-establishment of reaction, the alvine discharges continue so frequent as to indicate the expediency of restraining them by small opiates or astringents. But I believe that this seldom occurs, unless secondary enteric irritation is present, and is chiefly observed when irritant remedies have formed a part of the previous treatment.

Next we have to notice the treatment of cases recovered from collapse, but in which the restoration

to health has been delayed, and risk to life occasioned by secondary fever or inflammation.

The secondary febrile and inflammatory states are more or less adynamic. In India the febrile state is seldom simple, but generally accompanied with gastro-enteric, cerebral, pulmonic, or other inflammation, and the only practical remark to be made is, that when it does occur in its uncomplicated form, it must be treated on those general principles which we apply to adynamic fever, however it may have arisen.

When the injected conjunctivæ, delirium, or drowsiness, and slow pulse, indicate cerebral disturbance, and threatening secondary inflammation; or the florid tongue, the tender epigastrium, the vomiting, the diarrhœa, indicate gastro-enteritis, then we must apply general principles of treatment, by leeches and blisters according to the state of constitution. Cases 114. to 117. show that success may attend the use of such means.

But an important practical question remains to be considered. It is the tendency of pathological theory at present to relate these secondary inflammations, more particularly the cerebral, to the retention of excretions in the blood, and to point to elimination by the usual channels, as an indication in their treatment. Clinical observation is sufficiently in accordance with this theory as to justify our acceptance of the therapeutic principle; but it requires to be carried into effect with much caution.

Whenever the collapse has been of such duration as to render it probable that secondary dangers may arise, then, with the returning pulse and temperature of the surface, we may commence the use of a saline diuretic, and give it every third or fourth hour. The acetate or nitrate of potass in combination with spiritus ætheris nitrici, answers very well. At the same time simple

diluents should be given. Should cerebral complication threaten, and there be no symptoms of gastro-enteric irritation present, then we may have recourse to one or two ten-grain doses of calomel, to be followed, if necessary, by two or three drachms each of castor and turpentine oils. These means, however, must be very cautiously used, because I have already shown that under this state of the secretions calomel is slow to take effect on them, but quick to excite gastro-enteric inflammation. When, however, the threatening of cerebral complication co-exists with gastro-enteric irritation, we must abstain from the use of mercurial or other purgatives, for the excitement of gastro-enteritis will more certainly aggravate the head symptoms and endanger the issue, than the eliminatory action of the mercury effect good.

We shall, on the whole, find more scope for the use of mercurial and other purgatives in the cerebral complication after cholera in sthenic individuals, than in those who were debilitated before the attack. In asthenic constitutions we may expect to find cerebral symptoms complicated with gastro-enteritis more common than the simple form, and when this coincidence occurs, the remedial means are restricted to local depletion, counter-irritation, diuretics, and diluents.

Still, however, another practical question may be asked: May we not endeavour to control the secondary inflammations of cholera, more especially the cerebral, by the induction of mercurial action? My opinion is distinctly opposed to this proceeding, both because the adynamic state of constitution contra-indicates it, and the risk of gastro-enteric irritation, from the internal use of the remedy, more than counterbalances any advantage likely to arise from its theoretic use.

Such, then, are the opinions which I have formed respecting the treatment of cholera : but, before leaving the subject, it is desirable that I should state the estimate which I entertain of remedies which at times have been much used, but which, as yet, I have not had the opportunity of alluding to.

General Bloodletting, at one time so much used in India in the treatment of cholera, is now nearly abandoned. In the few instances in which I have myself adopted it, no good effect was apparent, and I believe that the recoveries which took place under its use in the early epidemics, were generally of that mild form of the disease now seldom seen, and for the cure of which rest and an opiate usually suffice.

My estimate of opium, *calomel*, *astringents*, and *stimulants*, may be gathered from the remarks which have already been made on the general treatment of the disease.

The *Hot bath*, with the view of restoring the temperature of the body and thus lessening the collapse, has been had recourse to. On this means of treatment Dr. Parkes* thus expresses his opinion: "The depressing effects of the warm bath were sometimes marked and unmistakeable. I have seen a man walk firmly to the bath, with a pulse of tolerable volume; and a cool but not cold surface, and in five or ten minutes have seen the same man carried from the bath with a pulse almost imperceptible, and a cold and clammy skin. I cannot find in my notes a single case in which the warm bath appeared beneficial." In the second number of the Transactions of the Bombay Medical and Physical Society, in 1839, I thus express the result of my own observation on the effect of the hot bath in cholera

* Treatise on Cholera, p. 209.

patients. "I used the hot bath in this case, and watched the effect, that I might have an opportunity of satisfying myself on this point of practice. The bath was plainly injurious." *

Further, I believe that a reference to the works of authors on Indian cholera will show a very general condemnation of the hot bath in the stage of collapse. This important fact would seem not to have been observed or attended to in the treatment of cholera in London in the epidemic of 1854, for I find † that in the metropolitan hospitals it was used in nearly 37 per cent. of the cases treated.

Emetics have been given in the collapse of cholera under the expectation that the act of vomiting might favour the coming on of reaction. In the cholera epidemic of 1849, in Bombay, a Cholera Infirmary was temporarily established by Dr. Mosgrove, for the treatment of the disease chiefly by the plentiful imbibition of cold water and the application of external heat. When this institution passed under the care of the late Dr. Larkworthy, I visited, through his kind permission, the patients almost daily, and sometimes twice a day for the period of a month. One of the objects in giving large draughts of water was, that the act of vomiting, and its assumed stimulant action on the pulse, might be from time to time induced. As I had never exhibited emetics in my own practice, I gladly availed myself of the opportunity of testing the accuracy of the principles

* Transactions of Medical and Physical Society of Bombay, No. ii. p. 240.

† Report on the Results of the Different Methods of Treatment pursued in Epidemic Cholera, Addressed to the President of the General Board of Health. By the Treatment Committee of the Medical Council.

on which they have been recommended; and the result of my observation distinctly was, that in the large majority of cases in which collapse was fairly present, the draughts of water and the vomiting were not followed by any sensible effect on the pulse. I witnessed many cases of ultimate recovery, in which the state of pulseless collapse continued from six to twenty-four hours after the commencement of the exhibition of the cold water; and I would further remark, that in some instances the frequent imbibition of water in large quantity seemed to me to keep up an irritable state of the stomach, which it was afterwards troublesome to subdue.*

Hot Saline Enemata were used by me in the European General Hospital, but without any effect in lessening the state of collapse.

Rubefacient Liniments, Turpentine, and Sinapisms have been generally applied in the stage of collapse; but I have no faith in their utility; and there is a disadvantage in the disagreeable odours which arise from some of them, and in their probable interference with the functions of the skin.

Of *Saline Injections into the Veins* I have no experience; but I apprehend that the experiments which have been already recorded are conclusive against them.

The *Inhalation of Vapours* seems to be a therapeutic means to which some still incline with hope. I have not had any opportunity of witnessing this mode of treatment, nor am I of those who see in it the prospect of good. If it be that the pulmonary is obstructed as well as the general capillary circulation, then the pulmonary channel of absorption into the blood is as much

* At p. 321. No. x. Transactions, Medical and Physical Society of Bombay, there will be found a letter on the treatment followed in the Cholera Infirmary, addressed by me to the Superintending Surgeon.

closed as the intestinal one. And when it begins to be re-established, can there be a doubt that pure atmospheric air will more surely minister to the restoration of the depressed vital actions than medicated vapours?

Galvanism has been applied with the view of exciting the action of the heart and the respiratory function in the stage of collapse, but without any results calculated to inspire hope. The coil machine has also, to my knowledge, been used after reaction with the view of re-exciting the secretory function of the kidney. In this therapeutic theory I have no belief. I do not question the statements which have been made to me of urine having been passed shortly after the passage of the electric current in the course of the kidneys and ureters. But I would suggest that the action has been on the muscular fibre of the bladder, into which the urine for hours previously had been slowly trickling, and not on the secretory structure of the kidney.

Cold Affusion and Wet Sheet.—Of these I cannot speak from personal knowledge; but I quote* Dr. Gull's summary:—

“On the Continent, in the former and in the last epidemic, cold affusion was highly spoken of as a means of producing reaction. The patient was placed in a warm hip bath, and cold water poured or thrown over the head, back, and chest. This was done quickly, and the patient then placed between warm blankets. If the first application was followed by any improvement, the operation was repeated every three or four hours. The results appear to have been on the whole more satisfactory than from the hot bath.”

“The ‘wet-sheet envelope’ was more commonly used in this country. The effects varied according to the

* Report, p. 206.

state of the patient, in the milder cases it favoured reaction, but when the disease was severe it was useless or injurious. The sweating caused by it added to the exhaustion, and had no influence in arresting the intestinal discharges. In none of the cases, which were many, in which we saw it tried, did it produce any good effect."

Results such as these are surely sufficient to induce medical men henceforth to abstain from a restless and too often injurious empiricism in the management of this disease.

ILLUSTRATIVE CASES.

102. *Collapse complete.—Restoration of Functions gradual, and without febrile Reaction.—Recovery under moderate Medical Treatment and Watching.*

Ruckmee, a Hindoo bearer, of twenty-five years of age, was brought to hospital at 4 P.M. of the 19th August, 1850, in the collapsed stage of cholera. The pulse was imperceptible, the skin cold, and the countenance sunken. On the 20th the pulse had become distinct, and the skin of better temperature; the alvine discharges not frequent but still watery. On the 21st the urine was restored, but the alvine discharges were still colourless. The pulse was more developed on the 22nd, the urine passed, the tongue was moist, and he was quite alert, and left the hospital the next day well, though the return of coloured alvine discharges was not mentioned in the Report.

He was treated with ammoniated stimulants and external heat, and on the 20th four grains of blue pill and three of camphor were ordered every fourth hour.

103. *Collapse complete.—Functions gradually restored under moderate Treatment.—Recovery.*

A Mussulman tavern-keeper, of forty years of age, after ten hours' illness, was brought to hospital on the 8th August, 1850. The pulse was imperceptible the skin cold and clammy, and the purging frequent. On the 9th the pulse was more distinct. On the 10th the urine was restored, and the alvine discharges were coloured. The conjunctivæ were injected, and

on the 11th there was slight incoherence. The pulse continued feeble till the 12th. He was discharged well on the 18th. He was treated with the usual ammoniated stimulants and external heat till the 9th, when three grains of blue pill and one grain of quinine were ordered every third hour, and continued till the 12th.

104. *Collapse complete.—The Urinary and Alvine Secretions gradually and slowly restored without special Treatment.—Recovery.*

A Mussulman female, twenty-five years of age, after eight hours' illness, was brought to hospital on the 2nd August, 1850, in the collapsed stage of cholera. The pulse was imperceptible, but it became distinct towards evening, and the vomiting and purging had ceased. On the 3rd the pulse and skin were good, but secretions not restored. On the 4th the urine had returned and the alvine discharges were coloured. She was discharged well on the 9th. On the day of admission the state of collapse was treated with external heat and ammoniated stimulants. On the 3rd effervescing draughts with half a drachm of nitrous ether were taken every third hour, and on the 4th five grains of Dover's powder, three of quinine, and two of chalk and mercury, were prescribed every sixth hour.

105. *Collapse complete.—Gradual Restoration of Functions.—Treatment mild.—No Fever.—Recovery.*

Jennoo, aged twelve, after eleven hours' illness with vomiting and purging, was brought to hospital on the morning of the 12th March, 1851. The skin was cold, the pulse scarcely perceptible, and cramps of the abdomen were complained of. Several scanty evacuations were passed in the day, and he vomited from time to time, and the pulse was imperceptible at the evening visit. On the 13th there was no urine, the temperature of the surface had returned, the pulse was of good strength, and the alvine discharges were coloured. On the 14th urine was passed; there was no secondary fever. He was discharged well on the 15th. He was treated on the day of admission with external heat and half-drachm doses of spiritus ammon. aromaticus every hour, and wine and sago every third hour; on the 13th and 14th with effervescing draughts every third and fourth hour, and the sago and wine continued at longer intervals; and on the evening of the 14th three grains of Dover's powder and two of chalk and mercury were ordered every fourth hour.

106. *Collapse complete.—Gradual Restoration.—No Fever, but slight secondary Gastritis.—Treatment mild.—No Mercury.—Recovery.*

Rama, a Hindoo labourer of twenty-two years of age, after twenty hours of reported illness with symptoms of cholera, was admitted into hospital on the 14th March, 1851, at 10 P.M. The pulse was imperceptible, the skin cold and clammy, the eyes sunken, and cramps of the extremities were complained of. During the night he vomited frequently, and one scanty watery evacuation with flocculi was passed, and on the morning of the 15th the skin continued cold and pulse imperceptible. No urine had been passed. Towards evening, however, the pulse had become perceptible, and the alvine discharges were coloured, but still no urine. On the 16th urine had been passed, but the pulse was still feeble. During the night there were four coloured evacuations, and he vomited from time to time. On the morning of the 17th the tongue was florid at the tip, but no secondary fever present. He was discharged well on the 19th. On admission, and on the 15th and 16th, he was treated with one-drachm doses of spiritus ammoniæ aromaticus every hour or second hour, wine and sago every second or third hour, and external heat and diluents; on the 17th and 18th with effervescing draughts, with eight minims of tincture of opium every fourth hour, and a sinapism to the epigastrium.

107. *Collapse complete.—Gradual Restoration of Functions.—The single Dose of Calomel, without Efficacy on the Alvine Secretions.*

A Parsee girl, of fourteen years of age, after nine hours' illness, was admitted into hospital on the 4th February, 1851. The pulse was imperceptible, but became distinct towards evening. The skin was not cold, but the eyes were sunken. The watery colourless evacuations continued till the 7th, with occasional vomiting. The urine was restored on the 5th, and the catamenia appeared on the 7th. She was discharged well on the 18th. Ammoniated stimulants and external heat on the 4th. On the 5th ten grains of calomel. The rest of the treatment consisted of effervescing draughts, a sinapism to the epigastrium, and sago and wine.

108. *Collapse complete.—Gradual but slow Restoration of Functions.—No secondary Symptoms.—Two Doses of Calomel given, but Effect on Alvine Secretions not apparent.*

Suddoo, a Hindoo labourer, of twenty years of age, after eight hours' illness with vomiting and purging, was admitted into hospital, at noon of the 14th March, 1851. He was collapsed, the pulse was imperceptible, cramps of the extremities were complained of. At the evening visit the pulse was found distinct, and warmth had returned to the surface. On the 15th the alvine discharges were still conjee-like; there was no urine, but the pulse was distinct, and there was no vomiting. There was no urine passed till the evening of the 17th, and up to that time the alvine discharges were not coloured. The pulse continued distinct, though feeble, but there was no drowsiness, no vomiting, no heat of skin. He was discharged well on the 21st. He was treated at first with ammoniated stimulants and external heat. On the 15th two ten-grain doses of calomel were given, and a diuretic mixture prescribed and continued till the 18th, but no mercurial after the 15th. Sago and wine every third or fourth hour throughout.

109. *Collapse complete, and of long Duration.—Restoration gradual and slow.—No secondary Symptoms.—Two Doses of Calomel given, but without Evidence of Efficacy.—Recovery.*

Bickee, a Hindoo female of thirty years of age, was brought to hospital on the 2nd March, 1851. The pulse was imperceptible, the skin was cold, the eyes were sunken. It was reported that she had been ill for twenty-seven hours. On the 3rd she continued pulseless, and with a cold skin; vomited frequently, and was occasionally purged, and passed no urine. On the 4th the pulse had become distinct and the skin warm. Watery evacuations still occurred, and no urine was passed till evening. From this time there was gradual restoration to health, without secondary fever. She left the hospital on the 9th. The treatment consisted of a ten-grain dose of calomel on admission, and another on the 4th, with ammoniated stimulants, wine and sago, and external heat.

110. * *Collapse nearly complete.—Treated with Calomel, not only inefficacious in restoring the Secretions, but probably injurious by causing Gastro-Enteric Irritation.*

Dhoondee, a Maratha labourer, of twenty-five years of age, after thirteen hours' illness, was admitted into hospital on the 29th January, 1851. The pulse was imperceptible, but the skin not cold. The pulse became distinct on the evening of the 29th, but continued feeble till the evening of the 30th. The alvine discharges, more or less frequent and watery, continued colourless till the 1st February, and there was frequent vomiting. The urine began to be scantily passed on the 31st. He was discharged on the 7th February. On the evening of the 29th five-grain doses of calomel were prescribed every third hour, and continued till 1st February, and diuretic mixture was used at the same time. From the 2nd, chalk mixture with opium was used to restrain the diarrhœa; and on the 6th an acetate of lead pill with opium was prescribed to be taken thrice.

111. *Collapse not quite complete.—Recovery.—Treated with Calomel, without Efficacy in restoring Alvine Secretions, but with probable Effect in retarding Restoration.*

A Mussulman sailor, of twenty-five years of age, after six hours' illness, was admitted into hospital on the 9th February, 1851. The skin was coldish, the pulse just perceptible, the features pinched, and cramps of the extremities complained of. Watery, colourless evacuations, with occasional vomiting, continued till the 14th, when they became coloured. The urine was restored on the 11th. The pulse continued feeble till the 12th, when it improved much in strength. No febrile heat of skin. He was discharged well on the 16th. During the period of collapse ammoniated stimulants and wine and sago were used. Five-grain doses of calomel were prescribed on the evening of the 9th, and continued every third hour till the 12th, when three grains of blue pill were substituted. On the evening of the 14th a draught of solution of muriate of morphia was used to restrain the diarrhœa, and on the 15th the compound chalk powder with opium was used with the same view.

* This and the three following cases were not treated by myself, but by others in the same hospital under my observation.

112. *Collapse incomplete.—The Inefficacy of Calomel on the Alvine Secretions evident.—Recovery.*

A Hindoo labourer, of twenty-five years of age, after fourteen hours' illness, was admitted into hospital at 2 P.M. of the 8th February, 1851. The pulse was feeble, the skin not cold; the alvine discharges continued frequent, watery, and colourless till the 11th. The urine was restored on the 9th. He was discharged well on the 14th. Ammoniated stimulants and external heat were used during the collapse. Five-grain doses of calomel were prescribed every third hour on the evening of the 8th, and continued till the 11th, when catechu grains five, opium one grain, were given thrice daily.

113. *Collapse complete.—Recovery retarded by secondary Gastric Irritation.—The single Dose of Calomel was probably injurious.*

A native Christian, of twenty years of age, following the occupation of a cook, after five hours' illness, was admitted into the hospital at eleven A.M. of the 16th January, 1851. He was in a state of complete collapse, and continued so, with frequent watery purging, till the evening of the 17th, when the pulse had become distinct and the skin warm. Throughout the stage of collapse he was treated with drachm doses of spiritus ammoniæ aromaticus every hour, and external heat; also sago and wine every third hour. On the evening of the 17th ten grains of calomel were given, and camphor mixture with nitrous ether prescribed. Vomiting became now troublesome, and on the 19th the tongue was florid; the vomiting had ceased on the 24th, and the tongue was natural on the 27th. The alvine discharges had become coloured on the 18th, and the urine then also restored. He was discharged well on the 30th. The treatment from the 18th had consisted of sinapisms to the epigastrium, and effervescing draughts.

114. *Symptoms relapsing.—Collapse complete.—Secondary febrile State with Gastritis, treated cautiously on general Principles.—Recovery.*

Manoel de Almeida, a Portuguese sailor, of thirty-five years of age, was admitted into hospital on the 15th January, 1851, at 8 P.M., said to have been ill two days. On admission the pulse was small, but on the 16th it was imperceptible. The alvine discharges were watery and colourless, and he vomited fre-

quently. The skin was cold and clammy, and the features sunken. The pulse became distinct on the evening of the 16th, but was feeble still on the 18th. The urine was restored on the 18th, and the alvine discharges were coloured on the 19th, and there was also some heat of skin on that day. Ten grains of calomel had been given on admission, and again on the 16th, and the stimulants and external heat used. From the 21st there was tender epigastrium, frequent vomiting, a tongue more or less florid, occasional slight heat of skin, but no diarrhœa. On the 25th there was hiccup, but it ceased on the 26th. From this date he gradually, but slowly, improved, and was discharged on the 26th February. The gastritis was treated with leeches on the 21st and 22nd; fomentations and a blister on the 23rd. Effervescing draughts were the only medicine given internally, with exception of two drachms of castor and turpentine oil on the 22nd, when the bowels were confined; but they were rejected.

115. *Collapse incomplete.—Secondary Cerebral and Gastric Symptoms, though Urine and Alvine Secretions restored.—Treated on general Principles.—No Mercury.—Recovery.*

Ayada Kajec, a Mussulman, of eighteen years of age, had been in hospital three days, under treatment for scabies; when, on the 26th February, 1851, he was attacked with vomiting and watery purging, but no cramps. On the 27th the pulse was just perceptible, the vomiting was troublesome, the purging had ceased; but no urine had been passed. During the night there were four coloured evacuations and a little urine. On the morning of the 28th the conjunctivæ were vascular, and there was drowsiness observed; and this continued during the 1st and 2nd of March. Though urine and coloured alvine discharges were passed, the pulse had become of good strength; from this date the drowsiness gradually lessened, and he was well on the 9th. On the 26th he was treated with ammoniated stimulants and chloroform in five minim doses; but the vomiting not being restrained, a sinapism was applied to the epigastrium on the 27th, and effervescing draughts, at first without, and then at the evening visit with, ten minim doses of tincture of opium were used every third hour. On the 28th the tincture of opium was omitted, and the simple draught continued. A blister was applied to the nucha, and on the 1st twenty-four leeches to the temples.

116. *Collapse complete and of long Duration.—Retarded Secretions. — Secondary Head Symptoms. — Three Doses of Calomel given, but without Effect on Alvine Secretions.—Recovery.*

Mahdoo, a Hindoo labourer, of twenty-two years of age, was taken ill at 3 A.M. of the 13th March, 1851, with watery purging and cramps of the extremities, but no vomiting; and five hours afterwards he was received into hospital, with sunken countenance, coldish surface, and pulse scarcely perceptible. He vomited several times during the 13th, but was not purged; the pulse, however, at the evening visit was imperceptible. During the night there was vomiting, and several thin greyish evacuations. On the morning of the 14th the surface of better temperature, but the pulse was still imperceptible, and the conjunctivæ becoming vascular. The pulse became distinct on the evening of the 14th, and continued so throughout the rest of his illness. Urine was said to be passed scantily on the 14th and 15th, but was absent on the 16th; it became however, free on the 17th. The alvine discharges were pale up to the 18th, after which their colour is not mentioned. The vascularity of the conjunctivæ, first noticed on the 14th, continued and increased, was unaccompanied with drowsiness, but with wandering delirium, commencing on the 18th and ceasing altogether on the 20th; vomiting on the 16th, 17th, and 18th. He was discharged well on the 24th.—*Treatment.* On the 13th, 14th, and 15th a ten-grain dose of calomel; on the 16th and 17th, ol. ricini two drachms, and ol. terebinthinæ three drachms; on the 16th and 18th leeches to the temples, and on the 17th a blister to the nucha. The rest of the treatment consisted of ammoniated stimulants, wine and sago, effervescing draughts, and external heat.

117. *Collapse almost complete and of long Duration.—Restoration of Secretions retarded.—Slight Head Symptoms and secondary Fever.—Two Doses of Calomel given, but their Effect on the Alvine Secretions not evident.—Recovery.*

A Hindoo, of twenty years of age, after seven hours' illness, was brought to hospital on the 21st March, 1851. The pulse was feeble, the skin was cold, and cramps of the extremities were present. He vomited from time to time, and passed watery

evacuations in bed; and on the 22nd the skin was still cold, and the pulse just perceptible; it became, however, more distinct towards evening, and some degree of drowsiness was noted; and on the 23rd the conjunctivæ were vascular. The urine was not restored till the 24th, and the alvine discharges did not become coloured till the evening of that day, when there was also slight heat of skin. He was discharged well on the 25th. During the period of collapse he was treated with ammoniated stimulants and external heat, and sago and wine; on the evening of the 22nd, and morning of the 24th, ten grains of calomel were given, and a diuretic mixture was prescribed.

118. *Speedy complete Collapse, and Death after Eight Hours' Illness.*

Mahomed, a Mussulman child, of eleven years of age, was attacked with vomiting and purging at 3 A.M. of the 13th April, 1850, and was brought to hospital three hours afterwards. The features were collapsed, the skin was cold, the pulse was quick and feeble, and soon became imperceptible. He was treated with external heat, and half-drachm doses of spiritus ammoniæ aromaticus. Died five hours after admission.

119. *Speedy Collapse.—Death in Seventeen Hours.*

Gunga, a Hindoo labourer, of twenty-four years of age, was attacked with vomiting and purging and spasms of the extremities at midnight. He was brought to hospital eight hours afterwards, on the morning of the 5th April, 1850. The pulse was just perceptible, the surface of the body was quite cold, and the features pinched. He was treated with external warmth, a drachm of spiritus ammoniæ aromaticus every hour, and wine and sago every third hour. He died nine hours after admission.

120. *Complete Collapse.—Slight Reaction; then Relapse.—Mercurials used.—Death.*

Francis Xavier, a native Christian, a sailor by occupation, of fifty-five years of age, had been two months resident in hospital, affected with chronic rheumatism; when, at 4 A.M. of the 1st April, 1850, he was attacked with vomiting and purging of conjee-like evacuations; the skin became cold, and the pulse feeble. Two ounces of the cholera mixture were given, and external warmth used. The purging and vomiting continued; he was pulseless in the evening. During the night

there were six watery evacuations, frequent vomiting, no urine. In the course of the 2nd April there were four milky-looking evacuations, and towards evening a little urine was passed. The pulse became distinct, and warmth returned to the surface. During the night there were seven conjee-like evacuations, the surface had again become chilly, and the pulse feebler. On the 3rd and 4th no improvement, and he died at midnight of the 4th. On the 1st April, calomel, ten grains, were given, and after that blue pill, five grains, every third hour, with an ounce of arrack every two hours.

121. *Collapse complete and of long Duration. — No Restoration of Secretions. — No secondary Symptoms. — Death.*

Angelina Costass, of forty-five years of age, a native Christian, was admitted into hospital on the 2nd September, 1850, after three days' illness. She was in the collapsed stage of cholera. On the 3rd and 4th she vomited frequently, but was not purged; the skin was cold, and the pulse at times just perceptible; no urine was passed; there was no drowsiness. On the 5th the pulse was imperceptible; there was no vomiting or purging; no urine. She was restless and moaning, and apprehended imperfectly what was said, and died at 4 A.M. of the 6th. She was treated with stimulants and external heat, and blue pill and camphor after the 4th.

122. *Collapse complete. — Drowsiness and Coma from Exhaustion, not Uræmia (?). — Death.*

Ragao Purub, a Maratha labourer, of forty years of age, after three hours' illness, was admitted into hospital at 6 P.M. of the 1st January, 1850. The pulse was feeble, the skin warm. The clear watery purging continued, and on the following morning the features were sunken, the skin damp, and the pulse not perceptible. During the day there was no urine passed, and towards evening there was some hurry of the breathing and tendency to drowsiness, and he died comatose on the following morning. Was treated with stimulants and one ten-grain dose of calomel.

123. *Complete and rapidly fatal Collapse. — Red-tinged Discharges. — Death.*

Dhondo Ramjir, a Hindoo servant, of forty years of age, whose wife had died of cholera, in hospital. This patient was

in attendance on her on the 26th November, 1849. On the morning of the 28th he was seized with purging, and was admitted into hospital three hours from the onset of the attack. The skin was cold, the pulse just perceptible, the breathing hurried, and the evacuations watery and tinged red. Under the continuance of these symptoms he sunk, and died eight hours after admission. Was treated with stimulants and acetate of lead pills.

124. *Complete Collapse.—Red-tinged Discharges.*

Shaik Ismael, a Mussulman sailor, of fifty years of age, after eight hours' illness, was admitted into hospital on the 28th November, in a state of complete collapse from cholera. This continued till the 29th, and frequent red serous discharges were passed from the bowels. He died at 7 P.M. of the 29th. Was treated with stimulants and acetate of lead pills.

125. *Complete Collapse.—Red-tinged Discharges.*

Ramchunder, a Hindoo labourer, of thirty-five years of age, after eleven hours' illness, was admitted into hospital at 5 P.M. of the 10th February, 1851. There were cramps of the extremities, the pulse was imperceptible, the skin was cold. During the night he vomited once, and passed two thin, scanty, pinkish-coloured evacuations, but no urine. During the 11th the pulse continued imperceptible, the skin cold and damp, and three or four thin pinkish evacuations were passed. He died at 4 A.M. of the 12th. One ten-grain dose of calomel was given, and he was treated with stimulants, external heat, and diuretics.

126. *Collapse complete.—Reaction without Fever.—Retarded Secretions.—Secondary Head Symptoms disappearing coincident with restored Secretions.—Then secondary Exhaustion, and Death.*

Iptoola, a Mussulman, of twenty-seven years of age, was seized with vomiting and purging at 3 A.M. of the 18th April, 1850, and brought to hospital six hours afterwards. The surface was quite cold, the pulse was imperceptible, the face pinched. On the 11th and 12th the pulse had somewhat returned, but the skin was still coldish, the purging and vomiting continued, and no urine was passed; and on the latter day the eyes were suffused and there was drowsiness. On the 13th and

14th still no urine, but the evacuations less frequent, had become coloured, the pulse of good strength, and the surface of natural temperature. The drowsiness continued and was still present on the 15th, on which day urine was passed in small quantity. On the 16th and 17th there was more urine, and the drowsiness had nearly disappeared, but without recurrence of vomiting or purging; the pulse lost strength, the skin again became cold, and he died at 3 P.M. of the 17th. Besides stimulants, external heat and diluents, he was treated with two ten-grain doses of calomel and blue pill frequently repeated; a blister to the nucha and scalp; diuretic mixture from the 15th, and chicken broth from the 14th.

127. *Collapse complete.—Retarded Secretions, but slow Reaction.—No Head Symptoms.—After Restoration of Secretions, secondary Gastro-Enteritis, and Death from Exhaustion.*

A native Christian female, of forty years of age, after twenty-one hours' illness with symptoms of cholera, was admitted into hospital on the 8th April, 1850, at 9 A.M. She was pulseless, the skin was cold, the face was pinched. During the day she vomited frequently, and passed watery evacuations, and the breathing became hurried. On the 9th, 10th, 11th, and 12th there was a very feeble pulse, a skin still below the natural temperature, occasional vomiting and purging, no urine, but no drowsiness. On the 13th the pulse and skin were good, the urine was passed, the alvine discharges were coloured. On the day of admission a ten-grain dose of calomel was given: with this exception, the treatment consisted of ammoniated stimulants, wine and sago, external heat, a sinapism to the epigastrium, and a diuretic mixture from the 10th. On the 13th all medicine was omitted; and the next report of the case was on the 16th, when the tongue was florid, the pulse feeble, and the bowels relaxed. These symptoms continued till the 19th, when two grains of acetate of lead and half a grain of opium were prescribed every fourth hour. On the 20th the purging had ceased, but the tongue was dry, and drowsiness was present. Death took place the following day.

128. *Admitted with Secondary Head Symptoms.—Urinary Secretion restored, but without Improvement.—Death.*

Baptist Fernandez, a native Christian, of fifteen years of age, following the occupation of a cook, was, after seventeen hours'

illness with severe purging, brought to hospital on the 29th June, 1850. He was drowsy and restless, the countenance collapsed, the skin warm and covered with sweat, the pulse quick and small, the alvine evacuations were conjee-like, the vomiting had ceased. On the 1st July the urine was passed, the skin was warm, and the pulse of good strength, but the drowsiness continued, and he died comatose on the 3rd. He was treated with mercurials, diuretics, leeches to the temples, and blisters to the nucha and scalp.

129. *Admitted after Recovery from Collapse, and with Urinary and Alvine Secretions restored.—Yet Febrile and Head Symptoms came on.—Death.*

Saccaram, a Hindoo labourer, of twenty-five years of age, after three days' illness, from purging, was admitted into hospital on the 23rd July, 1850. The pulse was quick but well developed, the skin was coldish. Up to the 28th he seemed to be going on well, the urinary secretion was restored, and the alvine discharges were coloured. On the evening of the 29th there was febrile heat of skin, the pulse was rapid and feeble, the tongue dry and very florid. On the 31st he was drowsy, and the respiration was laboured, and he died on the following day.

130. *Secondary Head Symptoms and Fever.—Retention of Urine might have been mistaken for Continuance of Suppression.—Death.*

Kailan, a native Christian, of thirty-five years of age, after five days' illness, which commenced with vomiting and purging, was admitted into hospital on the 25th January, 1851. The vomiting and purging had ceased, and urine had been passed; he complained of great thirst. The skin was warm and the pulse feeble, and at the evening visit he was observed to be drowsy. On the next day the drowsiness continued, the conjunctivæ were injected, the pulse was feeble, the tongue florid, and no urine had been passed. These symptoms had increased towards evening, and as there was some fulness over the pubes, a catheter was used and eight ounces of urine were drawn off. It was again used on the 27th. On the 28th the drowsiness was somewhat less and the urine was passed naturally, but he gradually sank and died comatose on the 30th.

RECAPITULATION.

The practical conclusions to which I have been led may be shortly re-stated under the following heads :—

1. In cholera epidemics there is a proportion of cases ushered in by premonitory diarrhœa, which if early treated by simple means are frequently curable, and the cholera attack is prevented. In some instances, however, the diarrhœa is not checked by treatment, and cholera becomes developed.

2. Cases of cholera occur—common in the early Indian epidemics, but rare in the later ones—in which the state of collapse is moderate in degree. In these the tendency is to recovery, not to death; but restoration is materially favoured by judicious moderate medical treatment.

3. When collapse is considerable, then we have a condition somewhat analogous to the cold stage of ague, or the initiatory fever of small-pox,—a state which cannot be checked, but which must run a certain course, varying in intensity and duration in different instances; and in which all that we can pretend to attempt, is to place the patient in circumstances as favourable as possible for enabling the system to outlive this stage of the disease, while we at the same time carefully abstain from the use of means which may be injurious, not only then, but in subsequent stages of the attack.

4. When reaction from collapse is taking place, the restoration of the various functions is a slow process requiring careful watching, mild assistance, and avoidance of officious interference. This expectant course is more certainly the correct one when the stage of collapse has not exceeded eight hours. When the

stage of collapse has been longer, the probability of secondary danger is increased; and when this arises it must be met, or when it threatens it may be modified, by cautious judicious medical treatment, directed with the fact constantly before us, that in this state of the disease gastro-enteritis is readily excited.

5. The secondary dangers of cholera are to be treated, on general principles, with that care and caution which it is always necessary to observe in all forms of disease present in states of constitution which tend to be adynamic.

6. In a disease amenable in its milder degrees to ordinary medical treatment—and in its severer ones, though beyond the influence of medicines, still often recovered from—the value of remedies cannot be tested by statistical data as hitherto recorded. Therapeutic principles drawn from such a source are very likely to be erroneous.

7. It is to be feared that cholera—as some other zymotic diseases in their severer forms; for example, plague, yellow fever, small-pox—will, in its severer forms, always prove to be little under the control of medical treatment; and that therefore in it, as in these others, the chief hope of lessening the mortality which it produces rests on our being able to understand its causes, and to prevent their action. To these important objects the attention of the medical profession should be earnestly given.

SECTION V.

STATISTICAL TABLES RELATIVE TO EPIDEMIC CHOLERA IN THE EUROPEAN GENERAL HOSPITAL, AND THE JAMSETJEE JEJEEBHAY HOSPITAL AT BOMBAY.

TABLE XX.—*Tabular Statement of the Admissions and Deaths from Epidemic Cholera in the European General Hospital at Bombay, for the Six Years from 1838 to 1843; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1838.		1839.		1840.		1841.		1842.		1843.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths on Admissions.	Admissions on Total Admissions.	Deaths on Total Deaths.
January	-	-	-	-	-	-	-	-	-	-	1	1	1	1	100.0	0.18	2.3
February	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
November	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	12	3	31	15	20	15	6	1	118	62	16	10	203	106	52.2	2.7	19.5
Deaths on annual admissions	25.0		48.4		75.0		16.6		52.5		62.5						
Admissions on total annual admissions	2.8		2.3		1.4		0.4		5.7		1.7						
Deaths on total annual deaths	10.3		16.3		14.2		0.9		39.7		0.0						

TABLE XXI. — *Tabular Statement of the Admissions and Deaths from Epidemic Cholera in the European General Hospital at Bombay for the Five Years from 1844 to 1848; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1844.		1845.		1846.		1847.		1848.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per cent. of Admissions.	Admissions on total.	Deaths on Total.
January -	4	4	-	-	-	1	-	-	-	-	4	4	100.0	0.6	8.7
February -	1	1	3	-	2	-	-	-	-	-	6	3	50.9	1.1	8.6
March -	5	4	-	1	-	-	-	-	-	-	5	4	80.0	1.03	13.3
April -	2	3	1	1	-	-	-	-	-	-	3	4	133.3	0.5	12.8
May -	1	1	4	2	6	5	-	-	-	-	11	8	72.5	1.9	26.6
June -	15	4	7	4	7	4	-	-	-	-	29	12	41.4	4.6	36.7
July -	2	1	4	4	1	-	-	-	-	-	7	5	71.4	1.03	13.9
August -	-	-	1	-	-	-	-	-	-	-	1	1	-	0.18	-
September -	1	-	-	-	-	-	-	-	-	-	1	-	-	2.2	-
October -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
November -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
December -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total -	31	18	20	12	16	10	-	-	-	-	67	40	59.6	0.98	10.3
Deaths on annual admissions }	58.1		60.0		62.5		-		-						
Admissions on total annual admissions }	1.8		1.5		1.1		-		-						
Deaths on total annual deaths }	18.8		16.4		13.7		-		-						

TABLE XXII. — *Tabular Statement of the Admissions and Deaths from Epidemic Cholera in the European General Hospital at Bombay, for the Five Years from 1849 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per cent. of Admissions.	Admissions on Total	Deaths on Total Deaths.
January -	-	-	1	1	5	4	1	1	-	-	7	6	85.7	1.5	15.4
February -	-	-	-	-	2	1	-	-	-	-	2	1	50.0	0.5	5.5
March -	-	-	-	-	4	2	-	-	-	-	4	2	50.6	0.9	5.9
April -	-	-	-	-	3	2	-	-	-	-	3	2	60.6	0.5	8.3
May -	-	-	-	-	5	3	-	-	-	-	5	3	60.0	0.9	12.5
June -	-	-	1	-	8	3	-	-	-	-	9	7	77.7	1.5	24.1
July -	-	-	5	4	1	1	-	-	-	-	5	5	100.0	0.9	15.1
August -	-	-	3	2	1	1	-	-	-	-	16	9	56.2	3.2	23.7
September -	12	6	4	4	-	-	-	-	-	-	10	7	70.0	2.8	28.0
October -	6	3	-	-	-	-	-	-	-	-	1	-	-	0.25	-
November -	1	-	-	-	1	-	-	-	5	3	7	3	42.8	1.3	10.0
December -	2	1	5	3	-	-	-	-	2	1	9	5	55.5	1.5	12.5
Total -	22	10	19	14	29	21	1	1	7	4	78	50	64.1	1.3	13.9
Deaths on annual admissions -	44.4		73.7		72.4		100.0		57.1						
Admissions on total annual admissions -	1.9		1.7		2.7		0.09		0.5						
Deaths on total annual deaths -	12.2		17.7		26.4		1.6		7.1						

TABLE XXIII.—*Tabular Statement of the Admissions and Deaths from Epidemic Cholera in the Jamsetjee Jeejeebhoy Hospital at Bombay, for the Six Years from 1848 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1848.		1849.		1850.		1851.		1852.		1853.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths of Admissions.	Admissions on Total.	Deaths on Total.
January -	1	1	-	-	10	7	122	69	25	18	-	-	60.2	7.5	21.1
February -	-	-	-	-	1	1	63	33	4	2	1	-	52.2	3.7	11.3
March -	-	-	-	-	28	15	95	47	17	9	1	-	50.3	6.6	18.4
April -	-	-	-	-	62	37	56	21	20	15	-	-	52.9	6.5	21.3
May -	-	-	-	-	25	16	47	16	11	9	1	-	48.8	3.8	14.3
June -	-	-	-	-	11	7	26	19	12	4	1	-	60.0	2.4	9.8
July -	-	-	-	-	25	14	-	1	12	5	-	-	54.1	1.8	6.5
August -	-	-	13	10	22	14	-	-	6	3	-	-	65.9	2.05	8.2
September -	1	-	53	34	9	7	2	2	1	-	-	-	65.1	3.3	13.8
October -	-	-	25	12	4	4	-	-	3	1	33	14	47.7	3.04	9.1
November -	1	-	42	14	-	-	3	3	-	-	48	30	47.8	4.3	13.6
December -	-	-	36	24	41	19	12	12	7	6	14	8	56.3	4.7	15.6
Total -	3	1	169	94	238	141	426	214	118	72	99	52	54.5	4.1	13.9
Deaths on annual ad- missions - - - }	33.3		55.6		59.2		50.2		61.01		52.5				
Admissions on total annual admissions }	0.08		4.1		5.1		9.6		2.8		2.3				
Deaths on total annual deaths - - - }	0.18		13.5		17.6		28.5		10.9		8.05				

CHAPTER VII.

ON DYSENTERY.

SECTION I.

THE IMPORTANCE OF DYSENTERY IN INDIA. — ORDER IN WHICH THE SUBJECT WILL BE TREATED.

DURING the six years of my service in the European General Hospital, 736 cases of dysentery were treated; and during nine years that I held medical charge of the Jamsetjee Jejeebhoy Hospital, 1642 cases were admitted. To these latter may be added* 1470 cases of diarrhœa treated during the same period; making an aggregate of 3112 affections of the bowels.

I have further had the opportunity of observing dysentery in its severest form in the hospital of Her Majesty's 40th regiment at Belgaum, when doing duty with that regiment in 1830; also in Her Majesty's 4th Light Dragoons at Kirkee, when attached to that regiment in 1832, as well as more or less in all the other fields of practice in which I have been engaged in India.

The importance of this disease is well established, and is at once shown by facts such as those exhibited in the following tabular statement:

* My reason for classing diarrhœa with dysentery will appear in the sequel of this chapter.

	Ratio per Cent. of Admissions from Dy- sentry and Diarrhoea to Strength.	Ratio per Cent. of Deaths from Dysen- tery and Diarrhoea to treated.	Ratio per Cent. of Deaths from Dysentery and Diarrhoea to aggre- gate Mortality.
* European troops, Bombay Presidency - -	22·7	11·100	32·441
† Do. do. Madras do. - -	23·949	8·721	- -
Native do. do. do. - -	3·782	12·804	- -
European General Hospital, Bombay (Dysentery)	- -	18·3	24·1
‡ Do. Officers, Bombay Presidency - -	- -	- -	5·7
Jamsetjee Jejeebhoy Hospital - -	- -	38·9	21·8
§ General population of Bombay - -	- -	- -	13·50

The ratio of deaths to treated varies according to the class of the sick, and the stage of the disease when submitted to treatment. It is therefore less in regimental than in general hospitals. It is very high in the Jamsetjee Jejeebhoy Hospital, because, as has been explained with reference to other forms of disease, the admissions often take place in hopeless states and stages of disease.

But the mortality rate from these affections would seem to be greater in the native than in the European troops of the Madras Presidency. I am unable to explain this result; and I shall on this, as on all occasions, purposely abstain from drawing pathological or etiological inferences from figured statements relative to bodies of men, with all the essential facts of whose circumstances I am unacquainted.

I shall be able best to elucidate the opinions which

* Mr. Webb's Medical Statistics. Transactions, Medical and Physical Society, No. i. 2nd Series.

† Mortality and Chief Diseases of the Troops under the Madras Government. By Lieut.-Col. W. H. Sykes, F.R.S. Journal of Statistical Society.

‡ My own Notes.

§ Mr. Leith's Deaths in Bombay.

I have formed relative to dysentery, by considering the subject in the following order: 1st. Pathology; 2nd. Causes; 3rd. Symptoms; 4th. Treatment.

SECTION II.

PATHOLOGY. — DETAILED STATEMENT OF THE MORBID ANATOMY.

BEFORE proceeding to describe the morbid anatomy of dysentery, I am desirous of clearing the way by making a few remarks on what may be termed the general pathology of the disease.

Dysentery may be defined to be inflammation more or less extensive, more or less acute, of one or other or all of the constituent parts of the mucous membrane of the large intestine.

When we regard the structural analogy of cutaneous and mucous tissue, we are in theory justified in expecting to find more or less resemblance in their pathological phenomena.

Inflammation of the skin shows itself under many and various forms: 1st, general redness, with or without desquamation of the cuticle,—the orders Exanthemata and Papulæ; 2nd, the cutis may become thickened in patches of greater or less extent, with an excoriated surface, and excessive development of epidermal scales,—the order Squamæ; 3rd, the upper layer of the cutis inflamed at points more or less numerous, more or less aggregated together, may lead to serous or puriform effusion confined by the superimposed epidermis in collections of various sizes,—the orders Vesiculæ, Bullæ, and Pustulæ; 4th, inflammation of the skin may extend to the subcutaneous tissue,

and lead to serous or puriform effusion, or gangrene, —erysipelas, carbuncle, and furunculus.

Further, let us bear in mind that, consequent on these various forms of inflammation, we may, as a result, have solution of continuity — destruction — of the skin by processes of ulceration or sloughing.

The several orders into which the cutaneous inflammations have been arranged have, moreover, been further subdivided into genera and species.

The opportunity which we enjoy of observing inflammation of the skin from its earliest appearance to its close, has enabled us to determine these facts of its pathology. They may, in theory, reasonably be assumed—to some extent—of the mucous membrane of the large intestine; but for very evident reasons they are, and must always be, insusceptible of proof, except in a very limited degree.

If the skin during life were removed from the sphere of our senses, and all that we know of its inflammations were derived from certain symptoms caused by deranged function or constitutional sympathy, and from the appearances which the results of inflammation exhibit on inspection after death, we should be, in respect to the pathology of the skin, very much in the position in which we now stand in respect to the pathology of the mucous membrane of the large intestine. In this state of hypothetical comparative ignorance of inflammation of the skin, we should probably find that our positive knowledge might be fully expressed by some such single term as *Dermatitis*, just as we find our present positive knowledge of inflammation of the mucous membrane of the large intestine sufficiently expressed by the single term *Dysentery*.

I make this preliminary statement, in order to show

that I do not refrain from speculation of this kind from insensibility to the fact, that there are enticing fields in which the pathologist may give rein to his imagination, if he so will; but because the interests of practical medicine demand that this faculty of mind should be kept in subjection and control.

I now proceed to the description of the morbid anatomy of dysentery. While my own observations are chiefly followed, occasional reference will be made to the statements of other writers.

The subject may be appropriately arranged under the following heads:—

I. The morbid appearances presented by the mucous membrane of the large intestine.

II. The complication of inflammation, or its results, of the mucous membrane of the large intestine, with peritonitic inflammation, general or partial.

III. Tumefaction in the region of the cæcum, or sigmoid flexure of the colon.

IV. Displacements of the colon.

V. Complication of ulceration of the mucous lining of the large intestine, with abscess in the liver.

VI. Complication of dysentery with morbid lesions of the stomach or small intestine.

VII. The coexistence of enlargement of the mesenteric glands with dysentery.

I.

The morbid appearances of the mucous membrane of the large intestine may be classed under the following heads:

- 1. Changes of colour and texture of the membrane;
2. Exudation on the free surface and into the tissue of the membrane;
3. Implication of the ordinary mucous follicles, or of the solitary glands;
4. Different forms

of ulceration of the mucous membrane; 5. The cicatrization of ulcers; 6. The separation of parts of the mucous coat in patches, shreds, or tubular portions.

1. *Changes of Colour and Texture of the Membrane.*—Occasionally in cases of disease which have proved fatal with the symptoms of chronic dysentery, the only morbid appearance found after death is dark red or grey, sometimes black (melanosis), discolouration of the mucous coat of the large intestine. This state may be attended with softening, thinning, or thickening of the tissue. Hypertrophy is more common than the other alterations of texture, and sometimes, in consequence of its having taken place unequally, the surface of the membrane presents an irregular mammillated or tubercular appearance. I have not satisfied myself, that there are any signs calculated to enable us to determine with tolerable accuracy during life, that these only, and not other morbid changes, have taken place. It is not improbable that they exist most generally in cases in which dysentery has alternated with other diseases—as rheumatism—and in which it is reasonable to infer that there may be something special in the character of the inflammatory action.

The following (131 to 134.) are illustrative cases:—

131. *Under Treatment Nine Months.*—*Dysentery alternating with Rheumatism, probably Syphilitic; terminating in General Cachexia with Febrile Symptoms.*—*The Lungs, Liver, Mucous Coat of Stomach and Intestines presented Morbid Appearances of Various Character.*

Charles ———, aged twenty-eight, after ten days' illness with dysentery, was admitted into the General Hospital on the 3rd November, 1841. The symptoms were for some time

urgent, and considerable abdominal tenderness was complained of. From the 5th to the 26th, he was reported to be convalescent. On the 27th, there was complaint of pain of the right leg and thickening over the tibia, chiefly troublesome at night, and subsequently, an irritable ulcer consequent on a boil formed on the inner part of the left knee. On the 18th December the dysenteric symptoms recurred, but did not continue for more than five or six days, — during which time the pain of the leg lessened and the ulcer on the knee healed. From the 25th December to the 1st March, 1842, he continued free of dysenteric symptoms, but suffered at times from swelling and pain of the left wrist alternating with pain in the course of the shins, or swelling of the left knee joint. About the 1st March he complained for the first time of occasional pain about the chest, chiefly the left side, but it was unattended with cough. Under these symptoms he continued, at times, losing strength and flesh, at others, rallying a little under the treatment adopted, till the 29th July, when febrile symptoms came on. At first they were confined to an evening accession, then became almost continued and attended with wandering delirium. The tongue was florid. There was occasional vomiting. The epigastrium was at times tender on pressure. The spleen was to be distinctly felt; and there was a dull sound on percussion some inches below the margin of the right ribs. He died on the 1st August, 1842.

Inspection fourteen hours after death made and reported by Mr. J. Peet.—Body emaciated, crude tubercles interspersed through the substance of both lungs. Rather more fluid than usual in the pericardium; heart healthy. — *Abdomen.* Liver extending entirely across the left hypochondrium, firmer than natural and presenting a dark brown mottled appearance upon cutting into it,—the same congested appearance was found throughout its substance, — in some parts there were distinct rings of a florid red colour. The gall-bladder distended; ducts pervious. The stomach and duodenum contained a quantity of dark chocolate-looking fluid, and the mucous membrane of both presented distinct patches of injected vessels; these were most distinctly seen near the pyloric extremity of the stomach.

The mucous membrane of cæcum of a dark, nearly approaching to a black, colour, but without thickening or ulceration. The transverse portion of colon upon its inner surface was in a state of excessive congestion, but there were no distinct ulcers, although in some parts the mucous membrane was soft and pulpy; the mucous surface of sigmoid flexure healthy. Coats

of ileum at its termination in colon thickened, in other respects, as well as the jejunum, healthy. Other viscera presented no abnormal appearance.—*Head* not examined.

132. *Gastro-Enteritis; the Kidneys had undergone Yellow Degeneration.*

Albert, an African of most dissipated habits, two months and seven days in the House of Correction, was admitted into hospital on the 13th December, affected with intermittent fever, attended with headache. The head was leeches, laxative medicine was given, and during the intermission two grains of quinine were thrice exhibited. On the 16th, 17th, and 18th no fever. On the latter day he complained of his limbs. On the 20th and 21st purging during the night was complained of, and Dover's powder with chalk and mercury was given. On the 22nd the purging continued frequent. The evacuations were reported to be watery and yellow. He had thirst and occasional vomiting, became more emaciated, and the pulse was feeble. The chalk and opium powder was given with tincture of catechu, laudanum and ginger every third hour, while necessary. On the 23rd there had been less purging and only once vomiting, but the countenance was more collapsed and the epigastrium tender. A blister was applied to the epigastrium and carbonate of ammonia was given with camphor mixture and laudanum every third hour. On the 24th there was no return of vomiting and purging, and the pulse was of better strength. The medicines were continued. On the 25th the countenance was more collapsed. There was hiccup and sinking pulse, but no recurrence of vomiting or purging. The tongue was dry. On the 26th he continued to sink, and died at midnight.

Inspection eleven hours after death.—Body rather emaciated, but to no great extent.—*Chest.* The viscera were healthy. There was no effusion into the pleura or pericardium.—*Abdomen.* There was no effusion of serum. The liver was healthy. The mucous lining of the stomach at the cardiac end for a space the size of the palm of the hand, was thinned and softened, and the large ramifications of the vessels were prominent and almost of black colour; the rest of the mucous lining was firm and somewhat thickened. The mucous lining of three feet of the end of the ileum was much thinned, with dark extravasated patches here and there. The mucous lining of the colon was thinned in places, in others there were dark red extravasated patches; the gut was filled with thin yellow

feculence. The spleen was healthy. Both kidneys were of twice their natural size; when incised both cortical substance and tubular processes were found in the state of light yellow degeneration, with in places dark red striæ crossing transversely; the pelvis of both kidneys and both ureters were much dilated.

133. *Chronic Dysentery, Discolouration with thickening of parts of the Mucous Membrane of the Large Intestines. — Commencing Degeneration of Kidneys.*

Antone de Cost, of African extraction, but brought up at Goa, of twenty years of age, and following the occupation of cook on board a ship. On a previous occasion, five months before his present admission, he was under treatment in hospital for pain of the right side of the chest and cough; and subsequently after discharge he suffered again from cough and expectoration, for which he was treated on board. For about two months before his last admission, on the 28th June, 1849, he had been affected with bowel complaint. He was much emaciated, and the pulse was very feeble. The tongue was moist and florid. He was purged from six to ten times in the twenty-four hours. The discharges were of slimy feculence, sometimes pale, at others of various tints of gray. He improved somewhat from the 2nd to the 10th July, then the purging increased, the discharges being more copious and watery. He died on the 21st. The abdomen was generally uneasy, full but soft. He was treated with various astringents and tonics combined with opium, and had for diet, milk, sago, and wine.

Inspection.—*Chest.* The lower part of the second lobe of the left lung was in a state of red hepatization, the upper lobe was somewhat adematous. The right lung adhered by old adhesions to the costal pleura, but was crepitating in its structure.—*Abdomen.* The liver was undiseased; the small intestine was somewhat attenuated. About three feet of the lower end of the ileum were laid open, but no morbid changes of the mucous membrane were observed. The mucous lining of the cæcum, colon, and rectum was in many places discoloured, of dark red, of brownish and of greyish tints, and in parts seemed somewhat thickened; in the sigmoid flexure and at the upper part of the rectum there were well-marked cicatrices of former ulcers.—*Kidneys.* In the central part of both there was commencement of yellow degeneration.

134. *Melanosis of the Colon.—No Ulceration.—Tubercles in the Liver.*

Private P. L., aged forty-five, of the Bombay European Regiment. Had frequently been a patient in hospital, with symptoms of dyspepsia. He was admitted for the last time at Bombay on the 13th April, 1829. He then complained principally of flatulence and debility. Seldom had pain of abdomen, but when present it was generally removed by carminatives and remedies of that description. He gradually became emaciated, without the symptoms becoming more distinct. Finally diarrhœa came on, and the dejections were of dark colour. He sunk slowly, and died October 29th, 1829.

Inspection.—The transverse colon was much distended, except at the middle portion, where it was a good deal contracted. Its peritoneal surface was of a dark colour, but there was no effusion of lymph, or other evidence of inflammation. The coats of the large intestine throughout its whole course were much thickened and of increased hardness. The mucous membrane was of dark colour, in some places almost black, and presented a very irregular surface, which was caused by numerous small globular bodies, each about the size of a pea. They were hard in consistence, of a colour almost black, and were apparently situated in the sub-mucous tissue. There were not any traces of ulceration throughout the whole course of the large intestine. The stomach was small, and owing to the distension of the colon, was forced upwards, and more to the left side than in the natural position; but its coats were free from disease. The small intestine was healthy. The liver was of light colour externally, with tubercles the size of cherry-stones in the substance of the left lobe. With the exception of old costal adhesions the thoracic viscera were healthy.

2. *Exudation on the Free Surface and into the Tissue of the Membrane.*—The uniform effusion of lymph for some extent over the surface of the mucous coat, in such manner as to lead to its separation in shreds or tubular portions, as obtains in the croupous forms of inflammation of the mucous membrane of the air passages, has been noticed by several writers on this disease. Its occasional occurrence in tropical dysentery may probably be admitted, but in my own cases I find only one

that will bear this explanation of the appearances observed. It has been already quoted elsewhere with a different object. (Case 60.)

A yellow or greyish granular exudation—sometimes small like grains of sand, at others larger and thicker—not unfrequently occurs on the mucous surface of some part of the colon or rectum, as well as of the ileum in cases of disease which have proved fatal with the symptoms of chronic dysentery. It presents itself in patches more or less extensive, frequently coursing round the intestine in transverse bands, and preferring the elevated part of the rugæ of the membrane. The granules are generally found adherent to the surface of the membrane, which is commonly of a red tint more or less dark. The mucous membrane and the sub-mucous tissue are also usually thickened, sometimes to a considerable degree, and when cut, the edges of the incision present a fleshy appearance.

This granular exudation and the thickening are however clearly preceded by a state of simple increased redness; whence it follows, that the occurrence adverted to under the first head—discolouration—may be merely the early stage of that which I now describe.

This granular deposit probably consists partly of modified epithelial debris, and partly of amorphous lymph exudation. It is noticed by Rokitansky, and Baly*, and I believe by other pathologists also.

This morbid condition has been observed by me most commonly in dysentery in persons whose constitutions are more or less cachectic. The analogy between it and the squamous order of cutaneous inflammation readily suggests itself. Cases 135 and 136., which follow, illus-

* Gulstonian Lectures, Medical Gazette.

trate this. Also 45. 47. 53. 80, 81. 196, 199. 200. 250. 262. 270.

135. *Chronic Dysentery in an Opium Eater.*—*The Mucous Coat of the Colon lined with a firm Granular Layer.*—*The Lungs tubercular.*—*Cartilaginous Contraction of the Pyloric Orifice of the Stomach.*

Wm. C., aged about thirty-five, a man of dissipated habits, an acknowledged opium eater, of spare and emaciated habit, and narrow chest, came to Bombay as the surgeon of a ship from Australia, and was under treatment in the General Hospital for delirium tremens. He was discharged cured, and remained out of hospital for about a fortnight or three weeks, when he was again admitted on the 10th of July, 1840, suffering from dysenteric symptoms, which had attacked him four or five days previously. The affection passed into a chronic state, and the purging was more or less urgent. He gradually lost strength and flesh, and died on the 3rd September. The treatment consisted of free opiates with bismuth, quinine and blue pill, wine and brandy.

Inspection seven hours after death.—Body much emaciated.—*Head.* There was a veil of serum below the arachnoid membrane, on the convex surface of the brain.—*Chest.* The lungs partially collapsed, adhered here and there to the costal pleuræ. A considerable part of the apex of the left lung was condensed from tubercular infiltration, and in it there was a cavity the size of an almond. The lower anterior part of the upper lobe of the left lung was also condensed from tubercular infiltration. In the lower lobe of the left lung there were many miliary tubercles disseminated throughout a crepitating parenchyma. There were numerous miliary tubercles in the right lung, but no where so far advanced as to condense any considerable portions of the tissue.—*Abdomen.* The intestines were collapsed. The liver was of dark red colour. The mesenteric glands were not enlarged. Four feet of the end of the ileum, and the large intestine were laid open. The contents of the end of the ileum were mucous and tenacious. The lining membrane was of dark red colour without alteration of texture. The mucous coat of the cæcum was dark red, the surface slightly roughened, as if sprinkled with sand, but the texture of the coat was natural. The inner surface of the colon was of dark red colour throughout, and presented a granular surface, increasing as the rectum

was approached, and there the granular secretion was most considerable, and most firmly adherent to the mucous coat, which was somewhat thickened, and, when cut, the edges of the incision had a fleshy appearance. There was one ulcer in the colon. The mucous coat of the stomach was natural in texture, but of dark brown colour towards the cardiac end. The pylorus was much contracted from a cartilaginous ring beneath the mucous coat. The mucous coat of the duodenum was dark red in colour, but healthy in texture. The kidneys were healthy.

136. *Diarrhœa tedious. — Granular Yellow Exudation on the Mucous Surface of the Large Intestine with Thickening of the Tunic.*

James Grady, aged twenty-three, private in Her Majesty's 15th Hussars, admitted on the 12th October, 1839, with febrile symptoms. Diarrhœa followed and continued troublesome. The dejections were generally of pale yellow colour and thin. There was frequently irritability of stomach, with fulness and tenseness of the abdomen, and florid tongue. Under these symptoms he became much emaciated and sallow, and died on the 13th January.

Inspection.—Abdomen. The chief disease was a yellow warty granular layer on the mucous coat of the large intestine, closely adherent to that coat, and attended with thickening, and a cartilaginous state of the mucous, and subjacent tunics. Where this granular surface was still thin, and only formed here and there, the mucous coat had not become thickened; the commencement of the granular exudation plainly preceded the thickening of the tissue.

3. *Distinct Implication of the Mucous Follicles, or of the Solitary Glands of the Colon.*—In the normal state of the mucous membrane of the colon, the mucous follicles are hardly apparent to the naked eye, but on the occurrence of increased secretion consequent on active or passive congestion, they become more or less prominent, and their orifices—dark coloured, slightly depressed points—are very distinct. This condition of the mucous follicles is very frequently observed in the examination of fatal cases of cholera, (85, 87, 88, 89, 90, 91, 92, 94,

95, 97.); also occasionally after death from remittent fever (36.); and it is very probable that it also occurs in cases of transient diarrhœa, and during and immediately after the action of an active cathartic.

The enlargement of the mucous follicles under these several circumstances, has as yet been unaccompanied by inflammatory action; but there is reason to believe that inflammation very readily takes place, and that its early stage is marked by general redness of the tissue or by a circle of vascularity around the orifice of the follicle, associated in some cases (138, 139.) with thickening of the mucous coat, in others (140. 147.) with ulceration. These conditions of the mucous follicles of the colon, though not frequently observed in fatal cases of dysentery, are very important with reference to that disease, because they are the early stages of morbid changes, which in their advanced states are very frequently present in fatal cases of dysentery.

Such, with a few verbal alterations, is the account which I published in 1845*, of the implication of the mucous follicles in dysentery, and my researches since have not suggested any change of opinion.

These remarks are intended to apply to the ordinary mucous follicles or crypts of the colon, and not to the solitary glands.

And here I find myself at issue with Drs. Parkes † and Baly ‡ on an anatomical question. These observers would, if I mistake not, regard the appearances which have just been described as caused by turgescence of the solitary glands. That my description is open to this in-

* Transactions, Medical and Physical Society of Bombay, No. vii. p. 139.

† Remarks on Dysentery, &c.

‡ Gulstonian Lectures.

terpretation, I gather from the circumstance, that in a notice some years since of my paper on Dysentery, in the *British and Foreign Medical Review* *, it is distinctly stated by the reviewer, that by the term "mucous follicles," solitary glands were meant.

My present object in calling attention to this difference of opinion is not to contest the point with the able pathologists whom I have named, but to suggest that it is a subject, in respect to which further and minute inquiry is required. As additional evidence of this, I would observe, that Rokitansky uses the term mucous follicles, and that it is not always clear, whether in his descriptions he speaks of the ordinary mucous crypts, or of the solitary glands. Dr. Murray, of the Bengal Medical Service, many years ago†, drew attention to appearances similar to those which I have described; but he applies to these enlarged follicles the term vesicles, and loses sight of the fact that the phenomena which he observed were probably more related to the cholera of which his patients died, than to the dysenteric symptoms under which they had previously suffered: he hence conceived from them,—on erroneous grounds, as seems to me,—an analogy between dysentery and small-pox. It is this follicular development, if I mistake not, which Dr. Bleeker describes under the term "Lenticular exudation."‡

But the question with me, is, not whether the mucous

* *British and Foreign Medical Review*, vol. xxiv.

† *Transactions, Medical and Physical Society of Calcutta*, 7th volume.

‡ *Indian Annals of Medical Science*, No. i. p. 4. I do not make this remark with absolute confidence. I have read Dr. Bleeker's very able paper with much interest and care, but I cannot satisfy myself that I rightly understand his description of the morbid ap-

follicles, or the solitary glands, are the glandular structures *exclusively* implicated in dysentery. I believe that the former are most generally engaged, but I know that the latter are also occasionally affected. They were so in case 258., and in one reported by Mr. Stovell, which I shall presently quote.

It may be gathered, moreover, from the tenor of these remarks that I am not prepared to coincide with Dr. Parkes in placing the almost exclusive origin of the morbid changes in dysentery in the solitary glands of the large intestine.

It will be convenient to notice here the terms vesicles and pustules, which by some pathologists have been applied to appearances presented by the mucous membrane of the colon. They were used by Dr. Murray in the paper to which I have just referred, but as already observed, I believe that, by these terms, he described an enlarged condition of the mucous follicles.

Rokitansky also alludes to vesicles, formed by the epithelium raised by clear serum, and this in connexion with the granular deposit of which I have already treated. Rokitansky implies that both appearances are different stages of the same process; that, after the discharge of the serum, the epithelium subsides in the form of branny scales. It does not, however, distinctly

pearances of dysentery. When I compare it with my own observations I find a sufficient resemblance to give me the impression that we have both looked upon the same objects; but I cannot avoid the suspicion that Dr. Bleeker has marred the distinctness of his pictures by a too exclusive generalization and by the unappreciated influence of a preconceived theory. This remark I make with great diffidence, being very sensible that the error may be with myself and not with the acute Batavian pathologist, whose co-operation I, equally with the able editors of the *Indian Annals of Medical Science*, have hailed with much and sincere pleasure.

appear whether this statement refers to what has been actually observed, or to a hypothetical explanation of the commencement of morbid changes witnessed only in their after stages. I have never myself noticed the elevation of the epithelium in the form of vesicles by small collections of clear serum; and yet I have had the opportunity of frequently observing the different stages of the process connected with this granular exudation: first, as reddened mucous membrane without thickening or exudation; second, some slight degree of thickening and sandy-looking deposit; third, increased thickening of the membrane and increased exudation—morbid processes more related, it seems to me, to the order *Squamæ* than to *Vesiculæ*.

The term pustular appearance has been used by Mr. Twining in reference to the early stages of dysentery; but he does not explain to what altered anatomical condition of the tissue it is applied. Small puriform collections in the submucous tissue, not elevations of the mere epithelium, are probably referred to. Though inflammation of the mucous membrane of the large intestine, analogous to *vesiculæ* and *pustulæ* of the skin, is a reasonable hypothesis, yet, in determining its probability, we must not forget the physical difference of the epithelium in the two situations.*

* Since this passage was written the translation of the *Rudiments of Pathological Histology*, by Carl. Wedl, M.D. by the Sydenham Society, has come into my hands, and I observe at page 213. the following observation:—

“When the delicacy of the epithelial layer of the mucous membranes in general, except in the *mouth*, *œsophagus*, *vagina*, and *palpebræ*, is considered, it is easy to comprehend that exudations poured out from the corium cannot produce any vesicular elevation of the epithelium. The single layer of epithelial cells is easily detached by the exudation collected beneath it; and the elements newly

The following is the case of enlargement and sloughing of the solitary glands reported by Mr. Stovell, and to which I have already alluded. It presents several points of much interest:—

*137. *Enlargement and Ulceration of Solitary Glands of the Colon, with Perforation of the Intestinal Walls.*—*Mr. Stovell.*

“S. B., widow, thirty-eight years of age, eight years resident in India, of somewhat intemperate habits, and the occasional subject of delirium tremens, was admitted into the European General Hospital on the 10th December, 1849. She had just arrived from Mahabuleshwur, where she had suffered from dysentery, and it was with this disease that she was admitted. The symptoms, however, were by no means urgent, and she improved for a time, the liver acting properly, her bowels becoming regular, and her stools almost natural. Still she did not recover any strength, and after a time her bowels again became relaxed, her motions, however, being always feculent, generally consistent, and latterly quite formed. She took medicines according to the varying indications from day to day. On January 12th I find the following statement in the diary of her case, which was kept by myself: ‘Does not seem to improve; bowels moved two or three times in the twenty-four hours; has occasional irritability of stomach, amounting even sometimes to vomiting; tongue moist and red; pulse nearly 100, and without much power.’ On the 28th—‘Bowels quite regular, stools natural; stomach less irritable; pulse weak.’ On February 3rd—‘Bowels quite regular, but she does not gain strength, and her pulse is 110, small and weak.’ After various slight alterations in the state of her bowels, I find on the 24th—‘Is not improving; is becoming weaker day by day, pulse varying from 110 to 120, small and weak; has no appetite; stomach much less irritable; bowels slightly relaxed again.’ On the 26th—‘Complaining of some degree of pain in the right hypochondrium, where there is evident fulness, from enlargement of the liver; pulse 120, weak; bowels in good order; stools quite natural; greatly reduced in strength, and much emaciated.’

formed from the exudation, are seen upon the exposed surface of the mucous membrane and often become the subject of observation when eliminated from the living organism.”

From this time she gradually sunk, and died on the 3rd instant. *Autopsy fifteen hours after death.*—*Chest.*—Viscera healthy.—*Abdomen.* On laying open the cavity of the abdomen, I found adhesion between the peritoneal covering of a small portion of the anterior surface of the descending colon, about four inches above its termination, and the peritoneal lining of the abdominal parietes in front of it. On separating this adhesion, I found a circular patch of ulceration, which had extended through all the coats of the colon, about the size of a rupee. Adhesive lymph had been thrown out, connecting the two opposite surfaces of the peritoneum immediately surrounding this circular patch, and forming in fact a kind of wall. The ulcerative process had extended through a portion of the opposite surface of the peritoneal lining of the abdominal parietes, into the muscular structure itself, a portion of which, to the extent of a rupee in size and shape, was laid bare. The wall of adhesive lymph had effectually prevented the escape of fœcal matter into the cavity of the peritoneum. The descending colon, throughout its whole course, was somewhat contracted, and its coats slightly thickened. Its mucous lining had a few ulcerated spots here and there, and the isolated follicles were greatly enlarged, standing out very prominent, and almost of a button-like appearance. The liver was enlarged, but not to any great extent. The other viscera healthy."

ENLARGED MUCOUS FOLLICLES.

138. *Diarrhœa after Convalescence from Measles.—Peyer's Glands and the Mucous Follicles of the Large Intestines generally enlarged.*

Martha Bennett, aged ten, a girl of the Byculla schools, an Indo-Briton of slight and delicate habit, was ill with measles from the 4th to the 16th January, 1839, and after convalescence was re-admitted into the sick ward on the 11th February. She was emaciated and had been affected with diarrhœa and occasional vomiting for two days, the evacuations being pale-coloured. She continued becoming gradually more emaciated, occasionally affected with vomiting, the bowels generally relaxed, but never to any great extent. The dejections were pale-coloured, copious, and sometimes slightly streaked with blood. The tongue was generally moist and clean, and the abdomen collapsed. She died on the 26th. The treatment had been

much varied; various preparations of chalk with opium, catechu, and quinine, enemata, calomel, and opium, &c.

Inspection fourteen hours after death.—Body emaciated; the abdominal viscera extended to the fourth rib.—*Chest.* The lungs collapsed; the edges and surface were emphysematous in many places. No tubercles.—*Abdomen.* The stomach was contracted, and the liver rather small. The colon was distended. The mesenteric glands were enlarged, and ranged from the size of a horse-bean to that of an almond, but showed no tubercular degeneration nor dark discolouration. The stomach contained undigested food, and its lining was coated with glairy mucus, but not altered in its texture. The ileum was in part distended, and filled with yellow fluid contents, and low down in the jejunum there were grains of rice unaltered in texture. All the coats of the small intestine were thinned. The mucous tunic peeled readily, but was not pulpy, and was in a few places of a reddish tint. At the lower part of the ileum, the patches of Peyer's glands were distinct, and standing in relief from the mucous coat; and throughout the whole tract of the small intestines, their inner aspect was studded with the isolated glands in slight relief from the lining coat: there was nowhere any trace of ulceration. The mucous lining of the colon was of leaden grey colour, and perhaps thicker and firmer than natural in texture. The mucous follicles were distinct, and in some the orifice would have admitted a pin's head. At the lower part of the colon and in the rectum, the inner aspect presented a grey irregularly cicatrized surface; the cicatrices very generally assuming a circular form. The liver was pale in texture, and not mottled. The kidneys were healthy.

139. *Gastro-Enteritis.*—*Redness and Softening of the Mucous Coat of the Stomach.*—*Mucous Follicles of the Colon enlarged.*—*Considerable Effusion of Serum in the Head.*—*Slight Drowsiness before Death.*

William Wittington, aged twenty, a sailor, was brought to the European General Hospital, on the 24th July, 1838, at 11 A.M. by the surgeon of the ship, who stated that Wittington had been ailing for seven days, during the first two of which he had suffered from slight diarrhœa, and during the subsequent five, there had been no recurrence of diarrhœa, but debility only had been complained of. It appeared that there had been vomiting on the day and night before admission, but no purging. On admission the skin was cold, the countenance sunken, the

pulse feeble, the abdomen was collapsed and bore firm pressure, the tongue was moist and florid at the edges, and there was strong tendency to sleep. A warm bath was used with good effect on the skin and pulse. A blister was applied to the back of the neck, and two grains of quinine, with four of aromatic confection, were ordered every second hour. He died at 2 P.M.

Inspection eighteen hours after death.—There were the marks of former cupping on the loins, and the cicatrix of an old ulcer in the groin.—*Head.* The pia mater was vascular, and there was a considerable quantity of serum effused, under the arachnoid membrane on the surface of the brain, and also at the base of the skull and in the ventricles.—*Chest.* With the exception of old adhesions of the right lung, the viscera were healthy.—*Abdomen.* The liver was natural and the gall-bladder was distended with bile, the stomach was collapsed and the small intestines distended. The mucous lining of the stomach had dark extravasated marbled patches towards its cardiac end, attended with softening of the mucous lining. The coats of the small intestines were thinner than natural; their mucous lining healthy. The mucous coat of the colon was of a dark colour, very vascular in many places, but not softened. The mucous follicles were numerous and largely developed. The kidneys were of dark colour externally, of chocolate colour internally, and were congested with blood. The spleen was somewhat enlarged.

140. *Dysentery admitted after a Fortnight's Illness.*—*Colon ulcerated.*—*Omentum matted over the Cæcum.*

Orin Williams, aged twenty-five, seaman of the ship "Shakespear," after a fortnight's illness with dysentery, was admitted into the General Hospital on the 18th April, 1842. The dejections reported to be scanty and frequent. The abdomen was full but bore pressure. The tongue was white and there was no febrile excitement. Ipecacuanha, blue pill, and gentian pills were ordered every fourth hour. On the 20th the abdomen, chiefly about the cæcum, was tender. Forty-eight leeches were applied and the pills continued, with the addition of one grain and a half of opium to each dose. The dejections were now dark red and serous. The abdominal tenderness and fulness did not subside. The pulse became frequent and small, the skin damp, and death occurred on the 24th. During this stage the treatment consisted in the use of enemata of acetate of

lead and tincture of opium, pills of quinine and opium, or camphor and opium with wine and sago.

Inspection eighteen hours after death.—Decomposition had commenced.—*Chest.* Viscera healthy.—*Abdomen.* The intestines were inflated. The omentum was matted over the cœcum, and adhesion between the different convolutions of the intestines had also taken place. A portion of the transverse colon was laid open; the mucous follicles were enlarged and many of them in the course of ulceration. The liver was free of abscess.

4. *Different Forms of Ulcer of the Mucous Membrane.*

—The term ulcer is here used in an extended sense to express destruction, more or less extensive, of the mucous membrane, irrespective of whether it has been caused by the true process of ulceration, or by one of more rapid fusion of tissue, or by a process of gangrene and sloughing.

Ulcers of the mucous membrane of the large intestine may be conveniently classed under the heads transverse and circular as elementary types. These two forms, however, though often distinct, are not unfrequently combined; and in their advanced stages they may coalesce, and thus form extensive irregular surfaces of ulceration. The *transverse* form, either in separate bands, or in several bands coalescing and occupying a greater or less extent of the inner surface of the large intestine, is generally found after acute attacks of dysentery, and is most commonly associated with more or less thickening of the walls of the intestine. The appearance of the ulcer varies according to its stage, and the state of the contiguous tissues. The bed of the ulcer may be occupied with a greyish slough; or the slough having been thrown off, the muscular coat may be exposed, and the edges of the ulcer may be irregular and thickened, or thinner and more rounded, with commencing cicatrization. On the mucous mem-

brane surrounding the ulcer granular exudation is sometimes observed.

In regard to the manner of formation of these transverse ulcers, I would in the first place remark, that one of the first effects of inflammation of the mucous lining of the large intestine is to stimulate the muscular coat to increased contraction, and, in consequence, to dispose part of the free mucous surface to arrange itself in transverse folds, as well as in rugæ observing other directions. This fact has, I am satisfied, not been sufficiently taken into account in our explanation of the irregularity of surface frequently presented by the mucous membrane in its morbid states.*

When describing the granular exudation I stated that it was frequently found on the summit of the transverse folds of the membrane. This is true of the ileum as well as of the large intestine. Why inflammatory action should show this preference for these situations I do not pretend to explain; but the fact is undoubted.

Let us further bear in mind, that, in the advanced stages of the granular exudation, there is always considerable thickening of the mucous membrane and submucous tissue; and that the transverse ulcers are most commonly associated with thickening of the intestinal coats.

These facts justify the inference that transverse ulcers, coexisting with thickening, are merely the last stage of that morbid process which, commencing with redness, terminates, in its chronic form, in thickening and granular exudation; but which, under acuter inflammatory action, either original or superadded, passes on to gan-

* I called attention to this in a paper published in the 7th volume of the Transactions of the Medical and Physical Society of Calcutta, in 1835.

grene and sloughing, and the formation of the kind of ulcer of which I now treat, as well as of others of different forms, also associated with thickening of tissue.

Under this view, then, it is assumed that the same morbid process which, going on slowly, gives rise to the symptoms of chronic dysentery, and does not pass beyond a state of thickening of the mucous membrane with granular exudation on the free surface, when it runs a more rapid course, gives rise to the symptoms of acute dysentery, and ends in gangrene and sloughing. This view also well explains how it is that we not unfrequently meet with cases of dysentery in which, after two or three days of apparently a simple diarrhœa, acute symptoms rapidly evolve themselves. In such we may suppose that the first stage—that of redness—of the process, has gone on mildly, but that, from some cause or other, exacerbation has arisen, and that then the process has gone through its full course, and that rapidly.

But there is still further evidence of this relation between transverse ulcers and granular exudation in the fact, that cases of dysentery are not unfrequently met with in which we find sloughy ulceration of one part of the mucous membrane, and granular exudation on the free surface of other parts, and these sometimes immediately adjoining the slough.

The following cases (141—153.) are illustrations of this last statement:—

141. *Dysentery with Adynamic Febrile Symptoms.—Granular Exudation on the Mucous Coat at the End of the Ileum.—Sloughy Ulceration of the Large Intestine.*

John Thompson, aged thirteen, of the Garrison Band, a delicate boy, who had been frequently in hospital with intermittent fever, was admitted on the 27th November, 1840, and stated

that he had suffered from bowel complaint for two or three days. The tongue was without fur, the abdomen supple, dejections yellowish, thin, and the iliac regions were tender. He was freely leeches and treated with ipecacuanha, gentian, and blue pill without purgatives. On the 29th pyrexial symptoms came on. The dejections thin and partly feculent. Abdomen tender. He was again leeches and the ipecacuanha and blue pill treatment continued. The purging became more urgent, the pulse rose to 120, and as the disease progressed it kept at that number. The skin became dry and the tongue brownish. He lost flesh and continued to pass light yellow dejections sometimes with streaks of blood. Enemata, opiates, a blister, &c. were used. He died on the 10th December.

Inspection twelve hours after death.—Body considerably emaciated.—*Head.* The membranes of the brain rather vascular and there were more bloody points than usual on incising the brain. There was an ounce of serum at the base of the skull.—*Chest.* The lungs collapsed and were healthy. Heart healthy.—*Abdomen.* Liver healthy. The omentum was matted over the transverse colon and the cœcum, and adhered to folds of the small intestine. The descending colon adhered to the lateral parietes, and the sigmoid flexure by tender adhesions to the walls of the pelvis. The mesenteric glands were enlarged from a horse-bean to an almond, and some of them were red. The small intestine contained much thin yellow feculence tolerably adhesive. For three feet of the end of the ileum, there was effused thin granular lymph, adherent closely to the mucous surface, and generally following the summit of the valvulæ conniventes, and appearing like transverse yellow granular bands. There was little of the mucous coat of the large intestines left except in the form of sloughy transverse patches; the muscular coat was distinct and denuded. The stomach was healthy.

142. *Granular Exudation on Mucous Surface of Ileum and Colon, with irregular Ulceration of the latter.—No Disease of the Liver.—Displacement of the Colon.*

Henry Green, aged thirty-six, private 4th Light Dragoons, ten years resident in India, suffered from fever twice at Kaira, but never from hepatitis, was admitted into the hospital at Kirkee, on the 21st April, 1832, with diarrhœa, was discharged on April the 25th. Re-admitted on June 1st, with mild dysentery, and was discharged on the 26th. Re-admitted on the 15th July, affected with frequent purging. The evacuations

contained blood and mucus and were passed with griping and straining. There was constant pain around the umbilicus increased by pressure. The disease progressed, and by the 21st the discharges were reddish-brown, watery, with clots of blood and shreddy matter. The pulse was frequent and small, the countenance collapsed, and hiccup present. He died on the 3rd July.

Inspection five hours after death.—The omentum was vascular, and adhered firmly to the surface of the transverse colon, also to the left side of the cavity of the pelvis, and to the sigmoid flexure of the colon. The large intestine throughout its whole course was much thickened and firm. The cæcum had formed no unnatural adhesions. The upper portion of the ascending colon adhered to the concavity of the liver. The commencement of the transverse portion doubled down towards the umbilicus, thence it ascended obliquely upwards towards the left side, passing to the left of the great arch of the stomach, to which it was closely bound; it reached the diaphragm, thence, after an acute duplicature, it descended closely bound to the left side of the abdominal parietes. The transverse colon had lost its cellular character. The meso-colon was vascular and thickened, its glands enlarged. The mucous coat of the ileum for about three inches from its termination was covered with granular lymph, effused on a dark red ground. The inner coat of the large intestine, throughout its whole course, had lost every trace of natural texture. The entire surface was irregular, and in many places granular lymph effused, rose in a small fungus. Many large ulcerations following the transverse direction of the bowel were covered with thick consistent pus-like secretion. Some of these ulcers had a black sloughy appearance in the centre. In the bottom of none of these ulcers did we recognise the muscular fibre. Surrounding the ulcers, and in most part of the inner coat not occupied by ulceration, there was a tenacious red transparent mucus effused; here and there on the surface of this effused mucus was granular lymph. The contents of the large bowels were light-coloured and watery. The stomach was displaced to accommodate itself to the displacement of the transverse colon; its inner surface was not examined. Liver healthy. Gall-bladder not distended. Lungs healthy. Heart healthy. There were one or two small points of deposit at the commencement of the aorta.

143. *Dysentery alternating with Febrile Accessions.—
Bands of Granular Deposit at the End of the Ileum.
—Sloughy Ulceration of the Colon.*

Goolab Poorie, a Hindoo beggar, of twenty-seven years of age, was admitted into hospital on the 17th June, 1851. He had suffered for about two months from quotidian fever, which commenced with chills in the evening. For fifteen days he had been affected with relaxed bowels, to the extent of eight to ten times in the twenty-four hours. From the time of admission to the 1st July, frequent thin feculent evacuations were passed with griping and straining. The tongue was florid and glazed, and there was occasional vomiting. The pulse was feeble, but febrile accessions were absent. He was treated with astringents, opium, dilute hydrocyanic acid, opiate enemata, and small blisters. From the 1st to the 16th July the bowels were composed, the vomiting ceased, the tongue lost its florid appearance, but the febrile accessions recurred and were tertian in type. He was now treated with hydrocyanic acid and quinine in small doses. From the 14th to his death on the 20th July, dysenteric symptoms recurred and the discharges contained blood-tinged mucus, and the febrile accessions ceased.

Inspection five hours after death.—The body generally was much emaciated, but there was a thick layer of fat in the parietes of the abdomen as well as in the omentum. The peritoneal covering of the small intestine was observed in some places to be slightly vascular, and some of the convolutions adhered to each other by tender lymph. A part of the great omentum (that covering the ascending and the transverse colon) was fleshy looking and of rose-red colour.—*Intestines.* The mucous lining at the end of the ileum presented red transverse streaks, the surface of which was studded with granular deposit. The ascending and the transverse colon were much thickened throughout, and presented internally almost a continuous surface of ulceration covered with greyish sloughs. In the mucous membrane of the descending colon and of the sigmoid flexure the ulcers were not so continuous. They were circular in character, each about the size of quarter of a rupee. The liver was of natural size and texture, but of pale yellow colour, both externally and internally. The mucous membrane of the stomach was pale-looking and soft, chiefly towards the cardiac end. Both the kidneys were healthy but ex-sanguine.—*Chest.* The lungs collapsed, were of spongy tex-

ture and free from adhesion. The heart was of natural size and its surface covered with fat, chiefly towards the margin of the right ventricle.

144. *Dysentery.—Sloughy Ulceration of Large Intestine.*
—*Granular Deposit in Transverse Bands in the Ileum.*
—*Peritonitis and Matting of the Omentum.—An Opium Eater.*

Dhyam, a Mussulman water carrier, of forty years of age, emaciated and addicted to the habitual use of opium, a native of Delhi, and not long resident in Bombay, was admitted into hospital on the 10th December, 1848. He had been ill with bowel complaint and febrile symptoms for twenty days. On admission, the abdomen was soft and collapsed, but uneasy on pressure at the umbilical region. During his stay in hospital the alvine discharges were frequent, consisted of slimy mucus tinged with blood, and were passed with griping, tenesmus, and occasional prolapsus. Febrile heat of skin was frequently observed, and the pulse was feeble; the tongue was moist and without fur. He died on the 24th December. He was treated first with ipecacuanha and full opiates; then acetate of lead or sulphate of copper or trisnitrate of bismuth were substituted for the ipecacuanha. A small blister was applied to the pained part of the abdomen.

Inspection six hours after death. — Chest. Lungs extremely collapsed, crepitating and healthy. Pericardium and heart healthy.—*Abdomen.* The liver appeared healthy, and was free of any abscess. The great omentum, coloured red, thickened and fleshy, was matted over the transverse colon, and adhered by friable lymph to folds of intestine (small and great) and to parts of the abdominal parietes. The convolutions of the intestines adhered by flakes of friable lymph to one another, to the viscera of the pelvis, and the parietes of the abdomen; and there was a blush of redness over them. The cœcum, the ascending colon, and the right half of the transverse colon were internally in a state of sloughy ulceration, and all the coats were tender, of greyish colour, and pultaceous consistence, and tore readily on separating the adhesions; the contents of the gut were thin and of greyish colour. The sigmoid flexure of the colon was in a similar sloughy condition. The rest of the colon was somewhat thickened with the mucous lining softened, but without any distinct ulceration. The ileum was laid open for about three feet of its length; there was general redness of

the mucous coat ranged in transverse streaks, corresponding to the valvulæ conniventes; and at the lower part of the intestine, the reddened surface was covered with a layer of firm, granular lymph, and the mucous coat underneath was thickened. This effusion of granular lymph lessened as the cæcum was receded from, and ceased $2\frac{1}{2}$ feet from the cæcum, but the redness in transverse streaks without the granular deposit extended somewhat higher. The kidneys appeared tolerably healthy. Head not examined.

145. *Probable Scorbutic Taint.—Dark, irregular, ragged, internal Surface of the Colon, with thickening.—Granular Deposit on Mucous Membrane of Ileum, with thickening.*

Dhondoo Essew, a Maratha labourer, twenty-one years of age, recently returned from Aden, where he had been employed for two years, was admitted into hospital on the 16th October, 1848, after ten days' illness from diarrhœa and febrile symptoms. He was reduced in strength. He died on the 8th November. The symptoms observed were frequent alvine discharges, scanty, passed with griping, and consisting of adhesive pasty or slimy feculence of palish colour, and frequently streaked with blood. There was no fulness or induration of abdomen, and seldom uneasiness on pressure. The tongue was sometimes coated in the centre, but was not florid. There was frequently an evening febrile exacerbation noted. The skin was always dry; the pulse feeble, sometimes irritable, and it ranged from 80 to 94. There was no sponginess of the gums, yet residence at Aden is well known to engender a scorbutic taint. The urine showed no traces of albumen. He was treated first with acetate of lead and opium, then with quinine, and full opiates, and a small blister was applied to the abdomen. Diet, milk, sago, port wine.

Inspection thirteen hours after death. The body much emaciated. — *Chest.* The lungs collapsed freely. — *Abdomen.* The intestines collapsed. No peritoneal adhesions. The large intestine was rather contracted, and very much thickened. The inner surface presented a dark green, very irregular and ragged surface, and the dark tint extended into the interstices of the tissues; and gave the cut edges of the thickened walls an almost black colour, in places. The inner surface of the ileum, for about two feet above the ileo-colic valve, was diseased; the mucous membrane red, thickened, and covered with a layer,

more or less thick, of granular, closely adherent lymph. The kidneys were healthy. The liver was healthy.

146. *Thickening and sloughy Ulceration of Large Intestine, with here and there a small encysted Abscess in the thickened Tissue.—Granular Deposit on Inner Surface of Ileum.—Peritonitis.—Old Pericarditis and Heart Disease.*

Corporal C. W., aged 31, of Her Majesty's 40th Regiment, after four days' illness, was admitted into the hospital at Belgaum, on the 8th July, 1830. There was tenderness of abdomen, and frequent purging, attended with tenesmus. The skin was hot and dry. The tenderness of abdomen, never entirely removed, was much aggravated on the 14th. The purging continued frequent, and he died July 16th. No ptyalism induced.

Inspection.—The peritoneal covering of all the intestines and of the convex surface of the liver was vascular and covered with flakes of effused lymph. The caput cæcum had formed firm adhesions, and in endeavouring to separate it from the iliac fossa, its coats readily gave way. The disease of the mucous membrane commenced at the termination of the ileum, where there were several vascular patches covered with a light effusion of granular lymph, but unattended with ulceration. In the cæcum and ascending colon the whole mucous coat was ulcerated and broken down, and the subjacent coats were much thickened, with here and there a small encysted secretion of pus in their tissue. In the transverse and descending colon the ulcers were large, but circumscribed, of an olive green colour in their centre, surrounded by a blush of redness, and uniformly attended with a thickening of the other tunics. The parenchyma of the liver was of lighter colour than natural. The gall-bladder contained little bile.—*Chest.* The pericardium adhered firmly to the whole surface of the heart, from which it could not be separated without the knife. The heart was natural in size, but of darker colour. The mitral valve was thickened and cartilaginous; the aortic valves were in a similar state, and instead of being applied to the sides of the vessel projected into its cavity, leaving dilated pouches behind them.

147. *Dysentery. — Sloughy Ulceration in Transverse Bands, and the Follicles of the Colon in different Stages*

*of Disease.—Insensibility for an Hour before Death.—
Two Ounces of Serum at the Base of the Skull.*

Edward Clark, aged twenty-four, a seaman of slight frame and dark complexion, was under treatment in the General Hospital from May 26th to 31st, 1839, ill with rheumatism, chiefly marked by rigidity of the muscles of the back of the neck, and of the masseter muscles. He was discharged well, and joined the Indian Navy. On the 6th June he was readmitted into the hospital, ill with dysentery. It was the fifth day of the disease. There was considerable fulness and pain of the abdomen, with tenesmus and pain at the anus. The countenance was anxious, the pulse frequent, and feeble, the tongue white, but not coated, and the evacuations were yellow, slimy, and streaked with blood. Five dozen leeches were applied to the abdomen, a warm bath used at bed-time, and pills of calomel seven grains, ipecacuanha and opium each one grain and a half, were given, and followed on the succeeding morning by four drachms of castor oil. During the night he was several times disturbed; the evacuations were watery, and tinged red. On the morning of the 17th, the abdomen continued full, and was somewhat tense and tender at the umbilicus. There was also considerable pain at the anus; the countenance was anxious; the pulse 116, of moderate strength, and the tongue pretty clean. Five dozen leeches were again applied to the abdomen, and fomentation directed to be used every second hour, and an anodyne enema to be exhibited at noon. The evacuations continued frequent, watery, and tinged with blood. The tenderness and fulness of the abdomen persisted, the skin was above natural temperature, the pulse 120, and irritable. At the evening visit the fomentations were continued, and calomel six grains, with opium and ipecacuanha two grains, given at bed-time. The purging continued during the night, and on the morning of the 18th, the skin was dampish, pulse 92, and feeble. There was less fulness of the abdomen, and less straining. A large blister was applied to the abdomen, and the anodyne enema was repeated, and three ounces of port wine ordered. At the evening visit the blister was found to have acted well, the purging, however, persisted, and the evacuations consisted of bloody serum with flocculi of blood. Pulse frequent and small, skin hot, much thirst, but the tongue not furred. There had also been frequent vomiting. Calomel and opium each two grains and ipecacuanha one grain, in the form of pill, were ordered every four hours. The purging was unchecked, and

he died at 7 P. M., having become comatose half an hour before death.

Inspection twelve hours after death.—The abdomen was moderately distended.—*Head.* There were about two ounces of serum in the cavity, chiefly at the base of the skull.—*Chest.* The lungs were emphysematous and not collapsed; but the thoracic viscera were otherwise healthy.—*Abdomen.* The omentum adhered to the cæcum, and to the colon; and many of the mesenteric glands were enlarged. At the hepatic flexure of the colon, an ulcer was patched by the opposing side of the angle. The whole of the inner surface of the large intestine was more or less diseased. There were sloughy ulcerations and elevated transverse ridges coated with a layer of granular lymph. The mucous follicles were also in different stages of disease; in some the orifice was merely apparent, in others it was enlarged by ulceration, and ranged from a mustard seed to the size of a six-pence. The mucous coat of the stomach was mammillated. The liver was pale in texture, and in the left lobe there was a small abscess, the size of a walnut. The kidneys were healthy.

148. *Dysentery neglected for Thirteen Days, attended with Abscess in the Liver.—Sloughy Ulceration of the Mucous Coat of the Colon, with Fringe of Granular Exudation.*

Charles Mitchell, aged twenty-four, of stout habit, four years resident in India. After thirteen days' illness, was admitted into the General Hospital on the 14th December, ill with dysentery. There was a good deal of uneasiness of the abdomen, and much tenesmus, and the dejections contained much blood mixed with mucus or serum. He died on the 3rd January.

Inspection.—*Abdomen.* In the right lobe of the liver there was an abscess the size of an orange, and in the left lobe there was one the size of a walnut. The large intestine was thickened, and there were large patches of sloughy ulceration of the mucous surface fringed with a layer of granular lymph. This layer of lymph was plainly secreted by the inflamed surrounding mucous coat, and not by the surface of the ulcer.

149. *Acute Dysentery.—The Large Intestine ulcerated in Transverse Ridges.—The Mucous Follicles enlarged.*—

Considerable Effusion of Serum in the Head without Symptoms.

John Billing, aged twenty-three, a stout muscular man, a seaman of Her Majesty's ship "Volage," was admitted into the European General Hospital, on the 28th December, 1838. In the statement of his illness, which accompanied him, it was noted, that on the 22nd December, he had been affected with slight diarrhoea, from which he had recovered. He was allowed to go on shore on leave, and returned to the ship complaining of inability to void his urine, and of pain and tenderness of the hypogastrium. A catheter was introduced, and the bladder was found empty. Subsequently, and after the exhibition of diuretics, the urine was voided naturally. On the morning of the 28th there was griping and purging, pain, and tenderness of the abdomen on pressure, a small and rapid pulse, cold perspiration, and a dark brown fur on the tongue. He was bled to twenty ounces, a blister was applied to the abdomen, some castor oil exhibited, and he was sent to the European General Hospital. On admission, at 5 P.M., the pulse was very feeble, the skin was cold, the respiration was somewhat hurried, the tongue had a thin brown coat in its centre, and the chief complaint was of debility, faintness, and frequent ineffectual calls to stool. The blister on the abdomen had risen well. An ounce of camphor mixture, with a drachm of aromatic spirit of ammonia and five grains of the sesquicarbonate of ammonia, was given on admission, and ten grains of calomel and two of opium at bed-time. The respiration became more hurried, the pulse thready, the skin cold and damp. Mulled wine was given every hour. He died at 2 A.M. of the 29th.

Inspection eleven hours after death.—*Head.* The vessels of the pia mater were moderately congested. On the convex surface of the brain between the pia mater and the arachnoid membrane, there was considerable effusion of serum, and the latter membrane was somewhat thickened and opaque. There were about six drachms of serum in each lateral ventricle, and about two ounces at the base of the skull. *Chest.* With the exception of emphysema of the upper lobes of both lungs, the viscera were healthy. *Abdomen.* The omentum adhered by fleshy points to the cæcum, the iliac fossa, and different parts of the ascending and descending colon. The sigmoid flexure of the colon was doubled down, and adhered to the fundus of the bladder, and to the rectum. The inner surface of the cæcum and colon was much ulcerated, under the form of closely set transverse ele-

vated indurated ridges, with an ulcerated surface fringed by a layer of granular gritty yellow lymph, or red gelatinous mucus. In many places, when the layer of lymph was removed, the ulcer was found in process of cicatrization. Many of the mucous follicles in the colon were enlarged, and some were ulcerated. Throughout the greater part of the large intestine, the submucous tissue was implicated, being indurated and thickened. The liver was healthy, and the gall-bladder full of bile. The small intestine was healthy. The mucous membrane of the stomach was somewhat softened, with marbled dark redness at its cardiac end, and in some places it was mammillated and thickened. The spleen, the kidneys, and bladder, were healthy.

150. *Acute Dysentery.—The Ulceration in Transverse Ridges.—Considerable Effusion of Serum in the Head, without Symptoms or Cirrhosis.*

John Gale, aged fifty-two, a tall man of sallow complexion, who had served for forty-two years in India, had generally enjoyed good health, but had led an intemperate life. After six days' illness, he was admitted into the European General Hospital on the 12th December, affected with frequent purging and pain of the abdomen. He described the evacuations to have been of various appearance, and frequently to have contained much blood. On the night before admission he had been constantly purged, and much blood had been dejected. There was acute tenderness in the course of the colon and over the cœcum. Pulse 120, feeble. Skin of natural temperature; tongue furred. He was ordered four grains of acetate of lead with two grains of opium, at bed-time, and to be repeated the following morning; port wine was also given in small quantities. During the night there was much purging, the evacuations being red and watery and on the morning of the 13th the pulse was almost imperceptible. The purging continued, the sinking increased, and he died at midnight.

Inspection eight hours after death.—Head. The vessels of the pia mater were turgid. There was considerable effusion of serum between the arachnoid tunic and the pia mater on the convex surface of the brain, and there was also considerable effusion at the base of the skull.—*Chest.* The lungs were of dark colour and emphysematous, but otherwise healthy. The heart was healthy.—*Abdomen.* The liver was of natural size, externally of pale colour, with an irregular surface. When incised the texture was found to be indurated,

was of a pale buff colour, and mottled. The mucous lining of the middle of the great arch of the stomach was mammillated; at the cardiac end it was thin, and in places almost removed. The end of the ileum was natural. The colon from beginning to end presented internally an irregular surface of sloughy ulceration, chiefly ranged in dark red fungous, closely set transverse ridges, some of which were half an inch thick, and fleshy when cut across. The free surface of these ridges presented either a foul ulceration or a granular gritty surface from effused lymph. The small intestine was contracted. In the right kidney there was a serous cyst of the size of a walnut, and the parenchyma of the organ was congested. The spleen was healthy.

151. *Dysentery in an advanced State obscured by Secondary Peritonitis.—Granular Deposit on the Mucous Surface of the Large Intestine.*

Shawah, a Hindoo washerman, of thirty years of age, was admitted into the Jamsetjee Jejeebhoy Hospital on the 25th December, 1851. He was emaciated, had been ill for a month, and could not give a connected history of his illness. He complained chiefly of uneasiness of abdomen, which was somewhat full and resisting. The bowels were opened sometimes two or three times in the day, and the evacuations were thin and feculent; at other times they were not opened. The pulse was feeble. The case was looked upon as one of subacute peritonitis, and was treated with leeches, opium, ipecacuanha, and castor and turpentine oils in small doses. He died on the 1st January.

Inspection.—The small intestine was full of air, and its convolutions were adherent to each other by bands of friable lymph. The transverse colon was displaced downwards at its central part. The omentum was matted over it, and was also closely adherent to the larger curvature of the stomach. There was a pouch-like dilatation of the upper part of the ascending colon. The coats of the large intestine were generally thickened; the mucous coat was pulpy, and generally softened, and studded over with large patches of ulceration—some of which, with the surrounding surface, had the granular deposit, so common in dysenteric affections in cachectic constitutions. The other viscera were healthy, with the exception of slight encroachment on the tubular part of the kidney.

152. *Several Attacks.—Colon thickened.—Sloughy Ul-*

ceration, with Granular Deposit on other Parts of the Mucous Surface of the Colon.—Slight Peritonitis.

Private J. A., aged thirty-five, of Her Majesty's 40th Regiment, was admitted into hospital at Belgaum, on the 8th July, 1830, ill with dysentery. The attack was acute, but he was discharged well on the 31st July. Re-admitted 10th August with tender abdomen, and other dysenteric symptoms. Ptyalism not induced. He was discharged on the 18th September, after having been in hospital a long time convalescent. Re-admitted September 23rd with tender abdomen and frequent purging. He complained for the first time of pain of the right hypochondrium. Was subjected to the usual treatment. No ptyalism. Died on the 1st October.

Inspection.—There was much fat in the omentum and about the mesentery. The omentum adhered slightly to the intestines. The small intestine had a blush of redness on its peritoneal surface. The caput cœcum was drawn upwards from its usual situation in the iliac fossa. The colon was thickened, covered with fat, and firmly adherent to the fundus of the gall-bladder, which latter organ adhered also to the pyloric portion of the duodenum. The transverse arch was closely connected to the stomach. The sigmoid flexure formed several folds in the hypogastrium, and the sides of the folds formed adhesion with each other. The mucous membrane of the large intestine was discoloured and ulcerated, and when floated in water exhibited a flocculent surface. Where less diseased there was a granular white effusion on the vascular mucous surface. The liver was rather enlarged, and of lighter colour than natural; no adhesion. The viscera of the chest were healthy.

153. *Dysentery admitted in the last Stage.—Peritonitic Inflammation.—Sloughy Ulceration of the Mucous Coat of the Colon.*

Robert Hunter, aged thirty-eight, a seaman of Her Majesty's ship "Endymion," was admitted into the European General Hospital on the 21st August, 1841. He stated that he had suffered from dysenteric symptoms for five weeks, but had not reported himself sick till ten days previously. On admission the countenance was sallow, reduced, and anxious. The skin dry, and above the natural temperature. The pulse 116, feeble and easily compressed. The abdomen was rather full and tender on pressure at the right iliac region. The tongue was florid at

the tip, dryish in the centre, and without fur. He had been frequently purged during the previous night, but the straining, formerly great, had considerably decreased. Thirty-six leeches were applied to the right iliac region, a warm bath was used, and the ipecacuanha pills with opium given. He was frequently purged during the night, the dejections of ochreous red colour, and intermixed with sloughy shreds. On the morning of the 22nd, pulse 88 feeble. The other symptoms as on the previous day. Two grains of opium, with an equal quantity of blue pill and ipecacuanha, were given every four hours. On the 23rd, the frequent purging continued, the dejections being of claret-red colour, attended with hiccup and sinking pulse. Acetate of lead and opium were given every four hours, two grains of each. The purging continued unchecked, and on the 24th, the opium was combined with sulphate of copper, instead of the acetate of lead, without any benefit resulting. He died on the morning of the 25th.

Inspection six hours after death.—The omentum, vascular and fleshy, extended over the intestines, adhered to the cœcum and to the abdominal parietes. There was dark vascularity, with transudation of lymph and tender adhesions of the peritoneal surface of the small intestine. The cœcum, ascending and transverse colon were thickened and tender, tearing readily and showing an inner surface of irregular ulceration, covered with dark-coloured adhesive secretion. Liver healthy. Thoracic viscera healthy.

Illustrations of transverse ulceration, with thickening of the coats of the intestine, but without granular exudation, 154. to 160.

154. *Acute Dysentery fatal in Nine Days.*—*Sloughy Ulceration of the Colon.*—*General Peritonitis.*—*Mattening of the Omentum over the Transverse Colon.*

William Nelson, aged twenty-five, of stout habit, Private in Her Majesty's 15th Hussars, and just arrived in India; after two days' illness, was admitted into hospital on the 17th November, 1839, with dysentery, and died on the 24th. There was little pain of the abdomen and the tenesmus was not urgent. The pulse was from 100 to 120, badly developed. The skin generally covered with moisture and coldish. The dejections red and watery, latterly with strong dysenteric fœtor. The tongue

was very little coated. He was bled, leeches, and blistered, warm baths, calomel, ipecacuanha, and opium, and quinine in the latter stages, were used.

Inspection.—*Abdomen.* There were slight peritoneal adhesions of the convolutions of the end of the ileum which adhered to each other; and the large intestine adhered to the abdominal parietes by flakes of lymph. The omentum was matted over the colon. The mucous glands at the end of the ileum were turgid but not ulcerated. The cœcum and colon were thickened and ulcerated throughout. The ulcers were dark coloured and sloughy, and running in transverse ridges; a few of them were circular.

155. *Obscure Remittent Fever, with Intestinal Irritation.*

—*Convalescence.*—*Acute Dysentery.*—*Extensive Sloughy Ulceration of Mucous Membrane of Colon.*

William Whitaker, aged twenty-one, Private 4th Light Dragoons. A recruit two months in India. Had bowel complaint at the Colaba dépôt. Admitted into hospital, 4th Dragoons, August 5th, 1832; arrived that day from Bombay; had been affected with purging without pain, on the march, and on the evening of the 4th with griping, straining, and some heat of skin. The abdomen was on admission full, with some uneasiness on pressure in the course of the colon. Was bled, took calomel and opium, and castor oil. On the 7th, stools feculent, no uneasiness of abdomen. He continued complaining principally of debility till the 23rd August. His pulse was for the most part frequent, skin hot and dry, tongue moist, and often quite clean. There was sometimes a remission in the course of the day, very often not, sometimes sweating during the night. The only symptom which might be considered as locating the disease was that the bowels were more acted upon by the medicines given than was usual, and the report of the 17th was thus:—Continues as before, with hot skin, restless during the night; several watery stools without pain, from blue pill and calomel and ipecacuanha, feculent, but with a few streaks of blood. From the 23rd to 31st sweated much every night; no fever during the day. From 3rd September to 14th, gradually gained strength, and on the latter date was sent to the convalescent ward, where he remained a few days. It subsequently appeared that during his residence in the convalescent ward there had been uneasiness of the bowels, of which he did not complain at the time. Re-

admitted September 22nd, stating that for the last three days he had suffered from purging and other dysenteric symptoms. It would be tedious to detail the symptoms and treatment. The disease pursued an unmitigated course. There was never much complaint of pain. He died on the evening of the 3rd October. Treatment: free venesection and leeching, blisters, calomel, and opium with inunction: no salivation. On the day of his death evacuations grumous, bloody.

Inspection nine hours after death.—No distension of abdomen. Liver enlarged, occupied the epigastrium and part of left hypochondrium. The enlargement was chiefly of the right lobe. The stomach, pushed into the left hypochondrium, left the duodenum previous to its doubling under the pancreas, uncovered by any viscus. Parts of the pancreas were also opposed to the anterior parietes. The omentum, greenish, vascular, extended into the pelvis, embraced closely the bowels, but did not form any adhesions. The intestines had a greenish tint; the large intestine felt firm and hard on pressure. The colon had not lost its cellular character; the transverse colon somewhat contracted, the descending portion more so; the sigmoid not contracted; the transverse colon at its commencement was doubled down, and for a short distance bound closely by old bands of adhesion, to the left side of the upper part of the ascending colon. Thus there was a sharp angle in the course of the bowel. The sigmoid flexure of the colon was situated in the pelvis, interposed between the rectum and the body and fundus of the bladder. The vessels of the mesentery, and also those of the serous lining of the pelvis, were somewhat vascular. The stomach contained green watery fluid. A large patch of the mucous coat at the cardiac extremity, mottled red,—the red-points, the arborescent terminations of vessels. The small intestine was opened throughout its whole extent. The contents of the ileum and end of jejunum dark green, consistent, tenacious; on washing this off from the surface, the membrane was of an olive-green tint, with minute granular aspect, as if fine sand had been sprinkled over a moist surface. This opaque, minute, white or tinted green granular deposit extended throughout the whole course of the small intestine, with this variation, that in the ileum, where the quantity of mucous adherent to the membrane was not great, the granules were applied immediately to the mucous surface, and stood out in very slight relief from it. The jejunum had a greyish tint, and there and at the end of the duodenum, where the secreted mucus was more abundant, the opaque granules formed a constituent of the secretion, were suspended

in it, and could be readily scraped along with the mucus from the surface of the membrane. In the ileum there were some abraded portions, and occasionally a greater than natural softness of the mucous tunic. In the jejunum there were some honey-combed patches running at right angles to the valvulæ conniventes,—an appearance, as if a more intimate adhesion had taken place between the mucous and muscular tunics, and caused a slight puckering at those sites. No redness in any part of the mucous tunic of the small intestine. The colon, principally the ascending, and the cæcum, contained much dark-red grumous, tenacious matter, and much washing was required to remove the tint from the inner surface of the bowel. Throughout the whole course of the large bowels there were many and irregular ulcerations. In the cæcum and ascending colon there were ridges left with a mucous surface; these ridges ran transversely, their centres frequently excavated by ulceration, following the course of the ridges. The surface of the portions between the ridges generally consisted of the muscular coat. The cellular tissue in the ridges was thickened. This portion of the cæcum and ascending colon when floated in water, showed long irregular, tender, thin membranous films attached to the ulcerated sides and centres of the ridges, thus giving to the bowel when floated a flocculent appearance. In the transverse colon there were some distinct round ulcers, having the muscular coat for their bed, and at their edges the mucous tunic was thickened. In the transverse and descending colon there were patches of gray mucous tunic, softened, but not otherwise disorganised. There were also large portions where all appearance of mucous coat had disappeared—nothing but patches of exposed grayish muscular fibre, with white shreds loosely adherent to it; this was most remarkable at the lower part of the descending colon, and at the sigmoid flexure. In the rectum there were blackish shreds, not formed by the muscular coat, but superimposed. The liver was healthy in structure: the gall-bladder contained healthy bile. The lungs were healthy.

156. *Thickening and Ulceration of the Colon. — Peritonitis. — Matting of the Omentum. — Congestion of the Liver. — Displacement of Colon.*

Private J. C., of Her Majesty's 40th Regiment, aged twenty-five, was admitted into the hospital at Balgaum, on the 5th July, 1830, affected with purging and tenesmus. The dejections contained mucus and blood. There was tenderness

at the epigastrium and hypogastrium. These symptoms were never much relieved. The tenderness of abdomen was frequently complained of, and finally the purging became more frequent, and the dejections watery and fœtid. He sunk and died July 19th.

Inspection.—The omentum and peritoneal covering of the intestines were vascular. The former adhered loosely to the small intestine, and firmly to the right iliac fossa; so that the distended transverse arch of the colon was drawn down towards the right iliac region. The large intestine adhered to the abdominal parietes, the liver, the pylorus, and urinary bladder; its coats were generally thickened, more remarkably so, where the mucous membrane was ulcerated. Ulceration of the mucous membrane was general throughout the colon, occupied principally the folds of the membrane, and did not observe any definite form. The liver was enlarged, and of darker colour than natural; its peritoneal coat was in many places opaque and thickened.

157. *Chronic Dysentery terminating in Ascites. — Colon Ulcerated. — Liver Healthy.*

Joseph Hall, aged thirty-one, seaman of Her Majesty's ship "Endymion," was placed on the sick list on the 30th April, 1843, suffering from chronic diarrhœa, to which he had been subject for many months. He did not improve under treatment, and was sent to the General Hospital on the 22nd May, labouring under chronic dysentery. He was a good deal reduced in strength and flesh. There was occasional pain of abdomen, and the purging persisted with more or less frequency. The dejections were at times pale, copious, and yeasty in appearance, at other times more scanty and tinged with blood. The tongue was always somewhat florid. Opium combined with quinine, bismuth, sulphate of copper, acetate of lead, nitrate of silver or ipecacuanha, was at different times exhibited and fairly tried. He continued to lose ground, and on the 6th July there was added a febrile accession, and the abdomen began to swell. The febrile symptoms persisted; the abdomen became tumid and tense without tenderness; there was occasional vomiting, the dejections were passed involuntarily, and he was delirious at times. Under these symptoms he sunk and died on the morning of the 13th July.

Inspection eight hours after death.—*Abdomen.* There were about twelve pints of clear serum in the cavity of the abdomen.

The liver was healthy. The inner surface of the colon was ulcerated throughout, the ulcers presenting elevated dark red irregular edges. The mucous coat of the stomach was marbled red.—*Chest.* The lungs were inflated. There was very little serous fluid in the cavity of the chest.

158. *Acute Dysentery, admitted late in the Disease.*—*Sloughy Ulceration of the Colon.*—*Adhesions of the Omentum.*—*Liver healthy.*

William Pitt, aged eleven, boy in the brig “Eliza,” after some days’ (the number not stated) illness, was admitted into the General Hospital on the 9th July, 1842. There was acute tenderness of abdomen on pressure, the pulse was frequent, the skin dry, and the dejections frequent, scanty, mucous, and tinged with blood. These dysenteric symptoms persisted, the tenderness of abdomen continued, attended with much moaning. He was leeches to the extent his feeble habit admitted of; ipecacuanha and blue pill with extract of gentian and opium were exhibited, and anodyne enemata and fomentations were used. He died on the 14th.

Inspection six hours after death.—*Chest.* Viscera healthy.—*Abdomen.* The intestines were distended with flatus. The omentum, spread over the intestines, adhered by a fleshy fringe to the sigmoid flexure of the colon. The liver was healthy. The colon was laid open, the mucous surface throughout presented numerous large sloughy ulcers with elevated edges. The ulcerated surface was most extensive in the cœcum and the sigmoid flexure.

159. *Dysentery.*—*General Peritonitis.*—*Sloughy Ulceration of the Colon.*

Daniel Thomas, aged sixteen, seaman, ship “Lady Kennaway,” after having suffered from dysenteric symptoms for about a fortnight, was admitted into the General Hospital on the 25th April, 1842. The calls to stool were frequent, the dejections were scanty and tinged with blood, and there was considerable tenderness of the abdomen, chiefly of the iliac regions, with occasional febrile excitement. During the five days following his admission, leeches were applied several times,—in all about nine dozen. The pills of ipecacuanha three grains and blue pill, and extract gentian two grains, with or without opium, were given every fourth hour, and afterwards a blister was applied

to the abdomen. The dysenteric symptoms persisted, and the pulse lost strength. Camphor, or quinine, and opium with occasional anodyne enemata, were had recourse to, with wine and sago. He died at midnight, on the 3rd May.

Inspection seven hours after death.—The omentum vascular. The intestines slightly distended with air presented a blush of redness over their peritoneal surface with here and there a few flakes of lymph. The colon thickened and distended, and the inner surface in a state of sloughy ulceration. Liver healthy.

160. *Dysentery. — Sloughy Ulceration in Transverse Bands. — Had been frequently subject to Pain in the Right Side. — Old Adhesions connected the Liver to the Side. — The Substance of the Liver healthy.*

Jeremiah Tribble, a pensioner, aged fifty-three, of broken constitution and feeble mind. He had, during the eighteen months before his death, been several times in hospital affected with pain of the right side or suffering from diarrhoea. He was admitted ill with dysentery on the 15th February, 1840. The evacuations became red, contained clots of blood and had dysenteric fœtor. He died on the 28th.

Inspection.—*Head.* There was considerable effusion of serum between the pia mater and arachnoid, and about an ounce at the base of the skull.—*Abdomen.* There were old adhesions of the liver to the concavity of the ribs, but the organ was sound in texture. The coats of the large intestine were easily lacerable, the mucous coat was very dark in colour and presented many transverse bands of ragged ulceration.

I have hitherto spoken only of *transverse* ulcers with thickened tissues, but this form of ulcer sometimes, though rarely, occurs without thickening of the surrounding mucous or other coats. I believe the process under these circumstances to be of a different nature, —that it is one of serous and lymph exudation, and supuration of the sub-mucous tissue of the transverse fold, followed by gangrene and sloughing of the mucous layer. I shall enter more fully on the consideration of this morbid process in connexion with the second form of ulcer — the *circular*.

Circular ulcers are generally found in dysentery of long duration, and in which the symptoms never have at any time been very acute.

According to Dr. Parkes and Baly they originate in the solitary glands. The latter author has described well the process of sloughing by which the gland is thrown off, and the circular ulcer is formed. That some circular ulcers of the large intestine are formed in this manner is not to be disputed. Such, however, constitute, I believe, but a small proportion of the circular ulcers which are met with in that situation. Many of them have seemed to me to originate in the mucous follicles. I have already explained that when these structures are irritated to increased secretion they become turgid and their orifices distinct; then a vascular ring surrounds them and exudation of serum and lymph in small quantity takes place into the mucous membrane of the follicle and the cellular tissue around it, soon to be followed by destruction of these tissues, through a process of fusion or sloughing.

Circular ulcers may probably also be formed by the same process as transverse ulcers, viz., by thickening and granular exudation of circular patches of the membrane followed by gangrene and sloughing. But this I put rather hypothetically than state as an observed fact.

Circular and other forms of ulcer may originate in circumscribed sub-mucous suppuration, of greater or less extent, followed by sloughing of the superimposed mucous layer; or, to express it otherwise, exudation of circumscribed portions of lymph takes place into the sub-mucous tissue, degenerates into pus, and is succeeded by gangrene and sloughing of the mucous coat which covers it.

This manner of formation of ulceration in dysentery

has been described by Haspel*; and if I understand Dr. Bleeker† rightly, it is the explanation of tissue destruction in dysentery which he exclusively adopts.

That ulcers are formed in this manner does not admit of doubt. The process is analogous to that by which some kinds of cutaneous ulcer are formed, viz., by small circumscribed sub-cutaneous abscesses with sloughing or ulceration of the superimposed cutis. But in the writings of Haspel and Bleeker it does not distinctly appear whether these observers have met with the small sub-mucous abscesses frequently or only very occasionally. If the latter,—which would be in accordance with my own experience,—then their opinion that intestinal ulcers are *frequently* formed in this way is in great measure hypothetical. If, however, on the other hand, they have frequently observed this morbid process in the *stage* of sub-mucous abscess, then the inference is, either that this process is rare in India compared with Algeria and Batavia, or that death in these latter countries takes place more frequently at an earlier period of the disease.

I have met with only one instance of sub-mucous abscess in my own researches; for this state is not to be confounded with that of intestinal thickening from lymph deposit with subsequent destruction, partly by sloughing, partly by suppuration (cases 146. and 172.).

The following is my only case of sub-mucous abscess:—

161. *Patches of Sub-mucous Puriform Infiltration in Colon.*

A Hindoo, with febrile symptoms, abnormal dulness of the lower part of right chest, with crepitus, was considered to be

* *Maladies de l'Algérie*, tome ii. p. 71.

† *Indian Annals of Medical Science*, No. i.

affected with pneumonia, and was treated in part with tartar emetic. He died, and a large abscess was found in the upper and central part of the right lobe of the liver, approaching the diaphragm; its walls were ragged and shreddy. On the inner surface of the cæcum, ascending, and transverse colon, there were sloughy elevated dark grey patches, of the size of a rupee, not separating, but pulpy, and chiefly remarkable from the distinct puriform infiltration into the sub-mucous tissue beneath. The kidneys were in a state of granular degeneration. Diarrhœa had not been present as a prominent symptom.

Circular ulcers of the mucous membrane in cachectic individuals may be formed in still another manner—by gangrenous patches consequent on sub-mucous œdema, just as in similar states of constitution cutaneous ulcers may be formed by a similar process.

The following is an illustrative case:—

162. *Sloughy Patches of Mucous Membrane of Colon, with Sub-mucous Œdema.*

Ram Dial, treated in the clinical ward, in February, 1852, for emphysema, dropsy, and dysentery. The surface of the mucous membrane of the large intestine was elevated from submucous œdema. The elevated patches were grey, circular, and gangrenous in the centre, and ranged in size from a rupee to a quarter of a rupee. In none had separation of the slough taken place. This case is more fully detailed elsewhere (No. 424.).

There is then, it seems to me, still considerable uncertainty, in regard to the mode of formation of ulcers in dysentery, more particularly of those which are circular in form.

Pathologists in India will do well to direct their attention to this subject and to pursue it with minuteness and care. The questions to be determined are, the relative proportion of these ulcers which originate, first, in the solitary glands; second, in the ordinary mucous follicles; third, in patches of mucous membrane thickened by exudation process; fourth, in sub-mu.

cous abscess; and perhaps, we may add, in vesicular and pustular processes of the superficial parts of the membrane. The circumstance of surrounding thickening of the mucous membrane, or sub-mucous tissue, or of both, should also be carefully noted. My expectation is that it will be found that circular ulcers are associated with surrounding thickening, chiefly when they are formed in the third manner.

I now quote cases illustrative of circular ulceration (163—168.).

163. *Numerous small Follicular Ulcerations of the Colon.*

Kuneem Khajee, a Mussulman pilgrim, of twenty years of age, on his way from Lahore to Bombay, with the view of proceeding to Mecca, was exposed to vicissitudes of weather, and three months before admission into hospital on the 28th September, 1852, became affected with bowel complaint. When he came under observation, he was a good deal emaciated. The face was puffed, the feet were œdematous, and the abdomen full, with indistinct sense of fluctuation and uneasiness in the course of the transverse colon. The bowels were opened eight or ten times in the twenty-four hours, and the evacuations, passed with griping and straining, were thin, slimy, and sometimes streaked with blood. The urine not scanty, had generally a specific gravity of 1020, and showed no traces of albumen. He died on the 4th October.

Inspection five hours after death.—The body was much emaciated.—*Chest.* There were about six ounces of serous fluid in the sac of the left pleura. There was not any pleuritic adhesion found on either side. Both lungs were pale and crepitating. The sac of the pericardium contained about four ounces of serous fluid. The heart was of natural size, and the valves healthy, but there was more than usual quantity of adipose tissue, both over the base and apex of the organ.—*Abdomen.* The sac of the peritoneum contained about ten ounces of clear serum. The liver was smaller than natural, and the internal surface and substance were of pale yellow colour. The gall-bladder and the gall-ducts were quite pervious. Stomach and small intestines collapsed, their peritoneal surface was pale. The large intestine was not collapsed; its coats were thickened apparently from œdema; the mucous membrane

was mottled red and white, and numerous small circular ulcers—some about the size of a pin's head, and others that of a split-pea—were seen scattered throughout the whole inner surface. They were most numerous about the sigmoid flexure of the colon, and many of them presented an appearance of cicatrization. The mucous membrane of the ileum was healthy, except close to the ileo-colic valve, where several circular ulcers were also observed. The kidneys were healthy.

164. *Chronic Dysentery in a Person of broken Constitution.—Numerous Follicular Ulcers in the Large Intestine, many of them cicatrizing.—Serosus Effusion in the Head without Symptoms.*

Henry Heming, aged forty-seven, an Indo-Briton, broken in constitution, feeble in mind, and subject to dysentery for many months, was admitted into hospital on the 2nd November, 1840. Both legs were œdematous and the surface of the right one was of dark red colour. The diarrhœa continued notwithstanding the different remedies used, which were chiefly bismuth, sulphate of copper, and quinine in combination with opium. The dejections were generally pale in colour and thin. He died on the 14th November.

Inspection thirteen hours after death.—Head. There was a thin veil of serum between the arachnoid and pia mater on the convex surface of the brain, and about an ounce at the base of the skull.—*Chest.* The lungs were fully collapsed. The right auricle of the heart was distended with blood.—*Abdomen.* The liver, not enlarged, was mottled red and white, and blood flowed from it when incised. The sigmoid flexure of the colon was much dilated and filled the space between the pelvis and umbilicus, and overlaid the cœcum. The end of the ileum and the large intestine were laid open. The mucous coat of the end of the ileum was of natural appearance and contained light yellow formed feculence. The coats of the colon were not thickened, except, in places, the mucous coat itself. The inner surface throughout was very closely studded with circular ulcers ranging from a silver penny to a small split pea in size. In some places the ulcers ran together, and formed irregular longitudinal vertical bands. For the most part the edges of the ulcers were rounded and cicatrized and the bed of the ulcers presented a dark grey cicatrized surface somewhat fleshy when incised. The surface generally had very much the appearance

of deep small-pox pits, shortly after desquamation. The parts of the mucous coat between the ulcers presented generally a dark reddish tint, but was not softened. The ulcers were most crowded in that part of the sigmoid flexure which was dilated. The mucous coat of the stomach was healthy. The kidneys and spleen were healthy. The mesenteric glands were not diseased.

165. *Dark Grey Discolouration, with some Degree of thickening of Mucous Membrane of Colon, with numerous Circular Ulcers.*

Luximan, a Hindoo beggar, of twenty-five years of age, after eighteen days' illness, was admitted into hospital on the 30th November, 1850. He was frequently purged; the evacuations consisted partly of thin feculence, blood, and mucus, and were passed with much griping and tenesmus. The abdomen was full, and tender on pressure, chiefly at the iliac regions. He suffered from febrile disturbance also. The symptoms continued with occasional alleviation, but at times hiccup was present and a gradually failing pulse, till 23rd December, when he died. Leeches were used at the commencement, followed by small blisters. Quinine and opium and then acetate of lead were given, and towards the end opium alone. Milk, sago, wine, and chicken-broth as diet.

Inspection eleven hours after death.—*Chest.* The lungs did not collapse readily; they were bound by old adhesions to the walls of the chest. The upper lobe of the right lung was crepitating, the middle and inferior lobes were oedematous, as was also the inferior lobe of the left lung. The heart was healthy.—*Abdomen.* The cavity contained about three pints of clear serum. The mucous membrane of the large intestine presented a dark grey appearance, was somewhat thickened, and did not freely move on the subjacent tissue. There were many round superficial ulcers, several of which were in process of cicatrization. The ulceration in its most active state was in the cæcum and ascending colon. The glands at the end of the ileum were more developed than natural. The mucous membrane of the small intestine was healthy. The mesenteric glands were somewhat enlarged, but free from tubercular deposit. The liver somewhat congested. Kidneys normal.

166. *Dysentery.—Circular Ulcers in the Colon.*

James Simpson, aged thirty-six, private of Her Majesty's 15th Hussars, just arrived in India. Had suffered from dy-

sentry whilst in England. Was admitted into hospital with dysentery on the 7th November, 1839. The dejections slimy, greenish, and scanty, in the first instance, became serous and bloody. He died on the 28th November. The mucous coat of the colon was studded with oval ulcers in various states of progress.

167. *Circular and Transverse Ulcers of the Large Intestine.—Matting of the Omentum over the Colon, with Displacement.—Liver Healthy.—Distention of the Urinary Bladder.*

Antonio Ignatio, of twenty-two years of age, and of spare habit, a native of Lisbon, a sailor by occupation, and once the subject of yellow fever at Rio de Janeiro, was admitted into hospital on the 25th July, 1851. He suffered from tertian fever for eighteen days, and some degree of enlargement of the spleen was noted. Dysenteric symptoms had been present for five days before admission, and there was pain of the abdomen on pressure at the umbilicus. While under treatment, the alvine discharges—from six to twelve in the twenty-four hours—are described as thin and feculent, passed with tenesmus, and occasionally with prolapsus. The tongue was coated, and latterly florid at the top. The febrile accessions occasionally recurred. He died on the 10th August. He was treated with opium and ipecacuanha, anodyne enemata, and the application of a small blister to the pained part of the abdomen.

Inspection ten hours after death.—Chest. Both lungs collapsed freely. They were soft and crepitating, but pale, and adhered to the parietes of the chest by firm bands of areolar tissue. The pericardium contained about two ounces of clear serum. The valves and structure of the heart were natural.—*Abdomen.* The liver was of normal size; its structure healthy. The spleen was somewhat enlarged. A small portion of the omentum was matted over the cœcum, and dragged the transverse colon downwards, and to the right side. The cœcum adhered to the anterior parietes of the abdomen by tolerably firm adhesions. The whole of the colon was distended by flatus. The whole tract of the mucous membrane of the large intestine presented numerous ulcers of various sizes. The smallest was of the size of a split pea, others—the largest—that of a dollar. Some were circular, others oval or transverse, and others were rendered very large and irregular by the running together of several smaller ones. The base of all these ulcers

was formed by the muscular coat. The mucous coat presented here and there a blush of redness chiefly around the margins of the ulcers. The submucous coat of the cœcum appeared to be thickened by serous infiltration. The kidneys were slightly enlarged, but their structure was healthy. The bladder was much distended by urine, and reached above the pelvis.* The ureters were also distended up to the kidneys. The mucous membrane of the anterior wall of the stomach presented a blush of redness.

168. *Dysentery.—Irregular and ulcerated Inner Surface of the Colon.*

John Garness, aged twenty-four, private in the 4th Light Dragoons; about two years resident in India, was on January 17th, 1831, admitted into hospital at Kirkee, with headache and pain of right shoulder. On the 19th there was pain of right side, increased by full inspiration, and by lying on the back; skin cool. This man was cupped, and the side rubbed with mercurial ointment.—26th, easy; slight cough.—29th, no pain; mouth sore. Discharged February 11th. Re-admitted with catarrh, November, 1831. In May, 1832, he had common continued fever for a few days. September 9th, 1832, admitted from the surgical ward, (where he had been long confined and much reduced from numerous *Guinea worms*), with dysenteric symptoms of two days' standing. There was little pain of abdomen and not much pyrexia. Blood and mucus were observed in the evacuations, and latterly, membranous shreds. Cold clammy skin for some days before death. Died September 23rd. Bled, leeches, blistered, mercury in the form of calomel, blue pill, and inunction; no ptyalism.

Inspection ten hours after death.—Omentum vascular, in parts fleshy. No adhesions of the cœcum. The top of the ascending colon adhered firmly to the gall-bladder and under surface of the liver. The ascending colon and commencement of the transverse were distended. The latter formed the common duplicature towards the umbilicus. At the middle of the transverse colon, the gut became contracted and thickened. The descending colon was similarly contracted, its natural connexions were vascular, but no new ones had been formed. The

* The distention of the bladder would seem not to have been detected before death. This is an oversight which ought never to occur in the treatment of dysentery, as attention to the state of this viscus should be a rule of practice.

sigmoid was not so much contracted, but it felt also firm and thickened, and the greater part of it was lying in the pelvis; its peritoneal coat was here and there vascular. Rectum thickened and firm. In the cœcum and ascending colon the mucous membrane had an irregular mammillated surface as if from unequal exudation of tenacious adherent mucus. Where this appearance existed the mucous membrane could be readily raised from the subjacent tunics. In the sub-mucous tissue there was not any thickening, for its filaments were distinctly seen on the stretch under the raised mucous membrane. The muscular coat was healthy. Here the disease was solely in the mucous tunic. Approaching the contracted portions, the irregularity of surface increased; and round, small, defined, superficial ulcers like small-pox pits began to appear here and there. They seemed to be in the situation of what had been large papillæ. Throughout the contracted portion, the sigmoid, and rectum, the irregularity of surface was so increased as to present a puckered fungoid aspect; here the bottom of the depressed interstices was evidently in most instances the sub-mucous tissue. Sometimes the elevations coursed in distinct transverse ridges round the bowel, still presenting a mucous surface, sometimes like red currant jelly. The more elevated ridges when cut into were hard and cartilaginous. In the sigmoid and rectum there were large isolated patches of the elevated portions, often surrounded by depressed portions, the bottom of which latter was formed by muscular fibre, discoloured, probably thickened. There was a greyish tint throughout the greatest part of the mucous membrane of the great bowels. The small intestine was healthy. The contents of ileum and jejunum were green, tenacious, not fœtid. Higher up in the jejunum and in the duodenum there was a tenacious yellowish mucus. In the stomach there were here and there some dotted red patches of softer structure than the rest of the tunic. Liver healthy. Bile in the gall-bladder. Spleen healthy. The cortical part of the right kidney was somewhat lighter in colour than natural. The lungs were healthy, but there were many old adhesions, principally on the right side, and to the diaphragm of same side. Heart normal.

5. *The Separation of Parts of the Mucous Coat in Shreds and Tubular Portions.*—We have not yet completed the description of the processes by which destruction and sloughing of the intestinal mucous mem-

brane is effected in dysentery. A form of inflammation acute and generally extensive may take place in the mucous membrane of the large intestine, which — from the course it follows, and the morbid appearances it presents after death — may reasonably be considered to be analogous in character to erysipelatous inflammation of the skin. It is commonly, but not exclusively, met with in Europeans who have not been long resident in India, and whose constitutions have been deteriorated by debauch and climatic influences. The mucous membrane is discoloured, and swollen from serous and lymph exudation. Serum and badly plastic lymph are diffusively infiltrated into the sub-mucous tissue, and, quickly degenerating into sero-pus, lead to gangrene of that tissue as well as of the mucous membrane itself. Hence the separation of patches and shreds of sloughy mucous tissue — often seen in the dejections during life, and found after death in various states and stages of separation. Cases 169. to 174. illustrate this condition of the intestinal structures.

169. *Dysentery.*—*Sloughs of the Mucous Coat passed before Death.*—*Much Displacement of the Colon to the Left Side.*—*Abscess in the Liver.*

Joseph Slayman, aged thirty-two, a seaman, was admitted into hospital on the 20th August, 1840. He had been ill with dysentery for fourteen days. On admission the abdomen was tender, the skin and tongue were dry, and the pulse moderately full. On the 22nd there was reported, tenderness of the left iliac region with perceptible hardness. Throughout his illness there was a good deal of tenesmus. The abdomen was moderately full, and there was more or less dysuria. Dejections watery, brown, and with dysenteric fœtor. On the 4th, 5th, and 6th September, considerable patches of sloughed mucous coat were passed. There were no peritonitic symptoms during the last days. He died on the 10th September.—*Treatment.* He was once bled at the arm, was leeches several times on the

abdomen, and around the anus. The abdomen was blistered. At first, two or three doses of calomel with opium and ipecacuanha were given, then ipecacuanha, gentian and blue pill, without purgatives. Afterwards free opiates frequently repeated in combination with blue pill and ipecacuanha or quinine and bismuth, according to the state of the pulse and skin. For two or three days acetate of lead and opium were freely used with partial alleviation of the symptoms. Light nourishment and wine.

Inspection, eight hours after death. Body emaciated.—*Chest.* Old adhesions of the right pleura; no emphysema. Viscera healthy.—*Abdomen.* The omentum adhered to the left lateral parietes, and had so dragged the colon from its natural situation that the cœcum was lodged in the pelvis, and adhered to the bladder. The right iliac fossa and all the right side of the abdominal region were occupied by the small intestine. The ascending and transverse portions of the colon passed vertically in the mesial line, extended under the stomach, and formed various turns before passing into the descending colon; these duplicatures adhered to each other, and the intestine was lacerated in many places, in separating them. The mucous coat of the end of the ileum was healthy. In the cœcum there were hanging loose dark sloughed patches of the mucous tunic. Lower down, the mucous coat had separated, and been thrown off, and a pearly glistening surface was left, with, here and there, bands and isolated patches of the mucous coat tolerably healthy, and standing out in relief. The liver was enlarged, and extended into the left hypochondrium. It was mottled red and white, and in the right lobe towards the diaphragm there was an abscess about the size of a large orange, and about half an inch from the surface. The pyloric end of the mucous coat of the stomach was mammillated. The kidneys were healthy.

170. *Acute Dysentery.—Extensive Sloughy Ulceration of the Inner Surface of the Large Intestine.—Dark Red Grumous Discharges.*

Charles Thompson, aged forty-two, a sailor of intemperate habits, who had been five years in the Indian Navy, and who had made frequent voyages to China during the twelve previous years, was admitted into the European General Hospital on the 17th July, 1838, after he had been ill with dysentery for five days. On admission the symptoms were not urgent. The skin, pulse, and tongue were natural. There was no distention

or pain of the abdomen or straining when he was purged. The discharges varied in frequency, they were generally tinged deeply with bile, and contained mucus. As the disease advanced, the purging became more urgent, and tenesmus more complained of. The dejections were more mucous and scanty, latterly they became dark red and serous, and contained clots of blood. The pulse became frequent and feeble, and the skin damp. He died on the 11th August. It would be tedious to detail the varied and ineffective treatment that was pursued.

Inspection five hours after death.—Body not very emaciated. — *Abdomen.* The omentum extended over all the intestines, and in the hypogastrium, and in the iliac regions, adhered to the walls of the pelvis by fleshy vascular fringes; it was also in other places more fleshy and vascular than natural. The intestines generally, both great and small, were of dark leaden colour, and were more distended than natural. The cœcum adhered by tender, and almost black layers of lymph to the lateral parietes, and in these places the coats of the bowel were black, and tore readily. The tunics of the ascending and transverse portions of the colon were also tender, and the latter part of the gut passed the left side of the stomach, was applied to the diaphragm, and bound by adhesions to the spleen. The descending colon adhered to the left lateral parietes, and on attempting to separate it, the coats readily gave way, and dark grumous blood escaped. The sigmoid flexure of the colon, before turning to reach the top of the sacrum, had dipped more into the pelvis than is natural; it adhered to the peritoneal lining of the pelvis, and its coats also tore readily. The same tender friable condition characterized the tissues of the rectum; so much so, that it was only possible to separate the gut in fragments. The whole of the large intestine was filled with dark grumous blood. The inner surface of the last two feet of the ileum was dark and red, vascular and softened. The coats of the cœcum were much thickened, the lining membrane being completely disorganized, and its place assumed by large dark purple sloughy shreds. In the transverse colon, the ulcerations were more defined, and where there was not ulceration, there the mucous coat was dark red, and softened. The condition of part of the internal surface of the descending colon, the sigmoid flexure and rectum, was similar to that of the cœcum. The lining membrane along the small curvature of the stomach presented marbled, red, extravasated patches, and was softer than natural. The liver was healthy. The kidneys were paler than natural. The thoracic viscera were healthy.

171. *Dysentery.*—*General Peritonitis before the Fatal Termination.*—*Serous Effusion in the Head; no Head Symptoms.*—*The Mucous Coat of the Colon in process of Separation from the other Tunics.*

William Anderson, aged twenty-one, stout, seaman of the ship "Lord Auckland," after ailing more or less with dysenteric symptoms for a fortnight, but much aggravated during the last two or three days before admission into the General Hospital on the 25th July, 1840, when the abdomen was full, tender, and resisting, pulse frequent and slightly sharp, but compressible. He was once bled from the arm, and leeches in considerable numbers were applied to the abdomen, so long as any tenderness remained. He was also blistered twice. Calomel in free doses with opium and ipecacuanha was given at the commencement, at bed-time, followed during the day with pills of ipecacuanha blue pill and extract of gentian. The dejections were, for the most part, of light yellow colour streaked with blood, and generally passed without much tenesmus. The disease not yielding, mercury was exhibited, partly by the mouth, partly by inunction, with the view of affecting the system. On the 17th August he was under the influence of mercury and an abscess formed at the right angle of the lower jaw. The purging, however, continued. Free opiates, in combination with bismuth, sulphate of copper, or acetate of lead, were given and opiate enemata were used. On the 29th August, the abdomen became tender, continued so and became full and somewhat tense. The sinking increased rapidly, the purging continued, and he died on the 1st September.

Inspection five hours after death.—*Head.* The vessels of the membranes were deficient in blood and the substance of the brain was rather pale. Between the arachnoid membrane and pia mater, at the posterior part of the hemisphere, there was a thin veil of serum, and there was also about an ounce at the base of the skull.—*Chest.* The viscera were healthy.—*Abdomen.* The omentum thickened was spread over the intestines and adhered to them, and to parts of the abdominal parietes by a red-coloured fringe. The convolutions of the intestines, great and small, adhered to each other by flakes of lymph, and on separating these, sero-purulent effusion oozed from among them. The end of the ileum and the large intestine were laid open. The mucous coat of the end of the ileum was healthy and its contents were fecu-

lent, and partly figured. The mucous coat of the large intestine was throughout of dark grey colour and pulpy aspect, and throughout almost the entire extent of the gut large patches were detached from the muscular coat and admitted of being readily separated. Between the mucous and muscular coats there was a yellow lymph-like lacerable layer. The stomach was healthy. The kidneys were healthy. Blood flowed from the liver where it was incised; in part the substance of the viscus was mottled buff.

172. *Sloughy state of Mucous Membrane of the Colon.—Submucous Puriform Infiltration, forming little Cavities.—General Peritonitis.—Matting of Omentum.—Retention of Urine.*

Mahdoo Suggujee, a Hindoo labourer, aged fifty years of age, and of feeble constitution, was admitted into hospital on the 2nd July, 1848. There was retention of urine, the abdomen was painful, and the pain was increased by pressure. He had also frequent calls to stool, and the discharges consisted of blood-tinged serum; he had been ill four days; he died on the 11th July. During the time he was under treatment, the alvine discharges were frequent, consisted of blood-tinged mucus or serum, mixed with more or less of feculence. The abdomen was full, doughy, or tense, with some degree of hardness on the right iliac region; was tender on pressure, and a sense of burning was at times complained of. The catheter had frequently to be used. From the 4th the countenance was anxious, and dysenteric foetor was observed. The tongue was more or less coated, the pulse was never above ninety-two, at first well developed, latterly becoming small. Leeches were several times applied. The treatment was commenced with grains ten of calomel, and two of opium, followed by castor oil, then ipecacuanha and blue pill were given at intervals, and latterly were combined with quinine. Turpentine stripes were applied to the abdomen.

Inspection twelve hours after death.—The abdomen distended, the body emaciated.—*Abdomen.* The small intestine was much distended from the duodenum downwards, and adhered to the abdominal parietes, and the convolutions to each other by flakes of lymph. The chief adhesions were to the pelvic walls and pelvic viscera, and over the descending colon. In the pelvis and in the lumbar regions there was a good deal of pus effused. The peritoneal surface under the flakes of lymph had a dotted red appearance. The large intestine was con-

tracted. The omentum was matted over the transverse colon. The inner surface of the large intestine throughout its entire extent was of grey black colour, pulpy, thickened, softened from disorganization, and here and there apparently in the sub-mucous tissue, were little cavities with ragged sides, containing grey fœtid, sero-puriform fluid.

173. *Sloughy Ulceration and thickening of Large Intestine.*

Bannio Bulthio, a Hindoo gardener, of thirty years of age, was admitted into hospital on the 19th November, 1852. His illness commenced fourteen days before admission, with looseness of bowels; then, in four days, the discharges became more frequent, were scanty, and streaked with blood; this state had been gradually becoming more aggravated. The discharges on admission were between twenty and thirty in the twenty-four hours, and were passed with much griping and straining. There was no fulness of abdomen, but tenderness of the iliac and umbilical regions was complained of. The tongue was white in the centre and florid at the tip. The skin was coldish, and the pulse feeble. He continued for four days passing scanty red serous alvine discharges, and died on the 24th November. He was treated with quinine and opium, wine and sago, and the application of small blisters on the pained parts of the abdomen.

Inspection fifteen hours after death.—Body somewhat emaciated; lungs slightly emphysematous at their anterior margins, but otherwise healthy. Heart somewhat larger than natural; no fluid in, or adhesions of, either the pleuritic or pericardial sacs.—*Abdomen.* No peritoneal adhesions. There were about two ounces of dirty serous fluid in the cavity. Spleen somewhat enlarged. Liver of natural size; its surface paler than natural, and its substance tinged with bile. Gall-bladder half full of inspissated bile. Kidneys of normal size, but rather paler than natural. Colon and rectum both very much ulcerated and thickened throughout their whole length, but apparently not much contracted. The ulceration occurred in the form of patches, and in some places attempts to repair had taken place. At the head of the colon, and in the rectum, a number of black sloughs were seen. Vessels of the ileum, at its junction with the colon, a little more injected than usual; but there was no ulceration. The coats of the large intestines were much softened, and several ruptures occurred in removing them. No bile in the

small intestine, and the large contained a considerable quantity of fæces, of a bluish clay colour. The mesenteric glands were not enlarged.

174. *Mucous Membrane of Colon sloughy and separating in Shreds.—General Peritonitis and Matting of the Omentum.*

Enam Khan, a Mussulman water carrier, of twenty-five years of age, was admitted into hospital on the 6th August, 1850. He was reduced in flesh. The abdomen was tense and generally tender on pressure, but more particularly so in the right iliac, epigastric, and left iliac regions. There was no dulness or induration. The skin was above the natural temperature. The pulse was frequent and somewhat irritable; the tongue was coated with a thin dark brown fur, and was florid at the tip and edges, but moist; the lungs and heart showed no signs of disease. He stated that he had been ill for a month with relaxed bowels; that at first the evacuations were thin and feculent, but after a few days consisted chiefly of scanty discharges of blood and mucus, passed with griping and straining, that for fifteen days there had been febrile symptoms, with tender abdomen. At the time of admission he was purged from fifteen to twenty times daily, and the urine was scanty and high coloured. On the 7th the scanty bloody mucous discharges continued, the pulse became more irritable, and there was hiccup. On the 8th the abdomen was more tense, full, and tympanitic, and he died at noon of that day. He was treated with quinine, opium, and ipecacuanha.

Inspection twenty-one hours after death.—Chest. There were firm adhesions between the greater part of the pleural surfaces of both lungs. The substance of the lungs was soft and crepitating. The heart was healthy, abdomen tense and tympanitic. On opening the cavity of the peritoneum some gas escaped. The great omentum was contracted, and matted over the colon, and was also attached by tender lymph to the adjoining convolutions of the small intestine. The small intestines were somewhat distended, and at points of their contact with one another there were continuous stripes of redness, about one-third of an inch broad. There was also slight effusion of lymph between the uppermost convolutions of the small intestine and the transverse colon and stomach. There were five or six ounces of seropuriform effusion in the pelvic cavity. The mucous membrane, throughout the whole extent of the large intestine,

was in a sloughy state; it was detached from the subjacent tunic, and in some places hung in loose shreds. There was some mottled redness of the mucous membrane near the pyloric extremity of the stomach, but this tissue was otherwise healthy.—*Head.* The vessels of the membranes of the brain were a good deal congested. The substance of the brain was apparently healthy.

There is one form in which these sloughs of mucous membrane are separated, which has given rise to some discussion among pathologists, and to which I must therefore more particularly allude.

Many years ago, in the printed proceedings of the Bombay Medical and Physical Society for the month of June, 1836, I ventured to express a doubt in regard to the occurrence of separation of tubular portions, of several inches in extent, of the mucous coat of the large intestine, and to suggest that the cases so accounted might probably be either intus-susception of a portion of the intestinal canal, with consequent strangulation, sloughing, and discharge, or the separation of a layer of lymph which had been previously effused on the mucous surface. But these doubts have long since been entirely removed by carefully examining some of these membranous dejections after their discharge, and also by observing, after death, the tissue in process of separation in cases in which, during life, portions had been evacuated. I have, therefore, satisfied myself that the separation of tubular portions of the mucous membrane is a pathological condition which may present itself in the course of that form of dysentery, of which I now treat. I have myself met with three well marked cases: the first in a soldier of the 15th Hussars, in whom recovery took place, and to whose case I shall presently more particularly refer; the second in the wife of a European pensioner, in consultation with

Mr. Sebastian Carvalho—this case ended fatally; the third in a Parsee female pregnant four months, in consultation with Mr. Bhawoo Dajee—this patient miscarried, but ultimately recovered. Mr. Stovell* reports two cases, observed by him in the European General Hospital in Bombay. The question has been discussed at great length, and with much ability, by Haspel.† He adopts the affirmative view, and quotes confirmatory cases strengthened by microscopic observation. Twinning would seem not to have been familiar with this morbid process; indeed, he almost doubts its occurrence.

As already observed, the reparative powers of the constitution are under some circumstances so great, that recovery, even from this serious lesion, at times takes place.

A soldier of Her Majesty's 15th Hussars, whose case has already been adverted to, was admitted into the European General Hospital in 1839, on the sixth day of his illness from dysentery. After ten days' residence in the hospital, a portion of membrane was discharged from the rectum, the description of which I find thus entered in my notes:—"The slough, of about one foot in length, was perfectly tubular, and evidently consisted of the mucous coat of part of the intestine; its sides were perforated by two or three ulcerations of different sizes, the largest about an inch in its longest diameter." He remained in hospital under treatment for about six weeks, suffering more or less from dysenteric symptoms, when he was discharged; and at that time the dejections were consistent and feculent, but of small diameter, as if passed through a narrowed canal. After

* Transactions, Medical and Physical Society of Bombay, 1st Series, No. x. p. 74.

† *Maladies de l'Algérie*. tome 2nd, p. 78.

ten days he was re-admitted with a relapse of dysentery, and remained under treatment for twenty days, when, improved in health, he proceeded to join his regiment at Bangalore.

As a morbid state, which may be confounded with that which has just been described, I would here allude to the occasional occurrence of intus-susception, — strangulation, sloughing, and discharge of part of the end of the ileum, — consequent, probably, on previous destruction of the ileo-colic valve. I have never seen an instance of this morbid lesion. Twining, in the course of eight years, met with five cases; and in two of them recovery took place. Mr. Stovell* reports an interesting case of the early stage of intus-susception, which I take the liberty of introducing here :—

* 175. *Intus-susception of the Ileum discovered after Death : Mr. Stovell.*

“ M. W., twelve years of age, born in India, of European parents, a weak, delicate, emaciated-looking girl, was admitted into the European General Hospital on the 25th ultimo, stating that her bowels had been greatly relaxed for the preceding nine or ten days. There was no urgency in her symptoms on admission, no fulness in the abdomen, and no pain on pressure; there was a feeling of uneasiness, but not amounting to pain. She was admitted in the morning, and during that day her bowels were moved twice, the stools being feculent, brown-coloured, and tinged with blood. She took small doses of calomel, opium, and ipecacuan. During the following night she passed four or five motions, consisting of dark-coloured fluid, mixed with blood, without the slightest trace of feculent matter; there was no tenderness of the abdomen on pressure. The following day the motions were numerous, and of the same description as before, but with a distinct trace of feculent matter; her stomach was irritable, and, attributing this to the use of the ipecacuan, I continued the calomel and opium

* Transactions, Medical and Physical Society of Bombay, No. x. p. 312. 1st Series.

without it; the abdomen remained quite flaccid, and there was no local pain. On the 2nd instant her motions were copious, and for the first time looked just like the rinsings of beef, such as we see in the worst forms of dysentery, and from that day there was never the least trace of bile; her stomach continued irritable, notwithstanding the omission of the ipecacuan, and her pulse now began to be rapid, weak, and small, but there was no local uneasiness. From this time no change took place in the character of her stools, and she gradually sunk and died on the 5th instant.

“Autopsy seven hours after death.—Chest. Viscera healthy.—Abdomen. On laying open the cavity of the abdomen, the whole of the viscera presented, at first sight, a perfect normal appearance. The entire peritoneal surface seemed particularly healthy, and there was no apparent distension of any portion of the intestines; the liver was perfectly normal in size and structure, but the gall-bladder was considerably distended. On separating the intestines, a little previous to removing them for examination, the cœcum caput coli appeared much larger than natural, and on close examination I found a partial invagination, formed by five or six inches of the extremity of the ileum being firmly impacted in the cœcum, but without the slightest trace of inflammatory action. A band of that portion of the peritoneum, which usually passes in front of the cœcum, was binding it down in the iliac fossa. It required some little force to withdraw the ileum from the cœcum, and the appearance, I would particularly remark, was totally different to that which is occasionally presented by an inch or so of the extremity of the ileum sinking, as it were, into the cœcum, where the former terminates in the latter at a nearer approach to a right angle than is usually the case. On withdrawing the ileum, and laying open the cœcum, I found nearly the whole of the mucous lining at its cul-de-sac extremity in a state of sphacelation, as if the unusual tightness of the band of peritoneum fixing the cœcum in the iliac fossa, and the abnormal pressure caused by the partial invagination, had together produced a degree of strangulation. The mucous membrane of the remainder of the large intestines was dotted with small spots of ulceration here and there; the small intestines were healthy, the coats of the lower portion of the ileum, however, being somewhat thickened, and its calibre slightly contracted.”

6th. *The Cicatrization of Ulcers.*—I was not prepared to find the cicatrization of intestinal ulcers mentioned,

as it has been, by several late writers, as a process with which Indian pathologists are not well acquainted. I cannot bring to my recollection the time when it was not as familiar to me as any other fact of the morbid anatomy of the disease. It is distinctly noticed by me in papers published in 1832 *, 1833 †, and 1845. ‡

The period of time when this healthy action may be expected to commence, and the duration of its progress, are points which it is impossible to foretell in any given case, because they are dependent more or less on coincident circumstances; — such as the state of constitution, the degree in which the process of repair has been promoted by judicious management, or counteracted by too active interference. It no doubt may be assumed that the less the constitution has been impaired, the more kindly the process of cicatrization will go on after it has commenced. Moreover it is evident from some of the cases to which I am about to refer — and it is a satisfactory fact, — that cicatrization of ulcers of the mucous coat of the intestine will go on under very adverse circumstances, such as the co-existence of abscess in the liver. The process of cicatrization has been minutely and well described by Drs. Parkes and Baly. It is one of lymph exudation, and organization and contraction of the edges of the ulcer. The appearances which it presents are illustrated by the following cases, 176. to 178. Also in 181, 182. 215. 274. 276, 277. 279.

* Edinburgh Medical and Surgical Journal.

† Transactions, Medical and Physical Society of Calcutta, vol. vii.

‡ Transactions, Medical and Physical Society of Bombay, No. vii.

176. *Dysentery attended by general Peritonitis. — The Ulcers in different Stages of Progress, some cicatrized, one perforating, but patched up.*

John Murphy, aged eight, was admitted into the sick ward of the Byculla schools on the 25th of September, 1837, ill with dysentery. After ten days he had recovered, the gums having become affected from the moderate use of hydrargyrum c. creta. Shortly afterwards, however, the dysenteric symptoms recurred, but were slight. On the 17th of November they had increased, and were attended with tenderness to the left of the umbilicus. The gums were still affected with mercury. From this time to the period of his death, on the 28th of November, the symptoms were more or less urgent. There were frequent calls to stool attended by tenesmus, and scanty discharges of blood-tinged mucus or serum. There was more or less tenderness of the abdomen, though never very acute; it was sometimes of the right iliac region, at others of the left; and unattended at any time with much distension. The skin was often hot and dry. The pulse ranged from 120 to 130, and was occasionally sharp and irritable. The tongue was generally clean and moist; but towards the end of his illness it became florid at the edges and tip. The treatment consisted of leeching and blistering, opiate enemata, opium combined with ipecacuanha, and with acetate of lead, &c.

Inspection six hours after death. — Abdomen. There were three or four ounces of sero-purulent fluid in the cavity. The omentum was vascular, spread over the small intestines, and adherent to them. The peritoneal surface of the anterior parietes, that of the ileum, the sigmoid flexure of the colon, and the rectum, was dotted red, and the convolutions of the ileum adhered to each other by flakes of lymph. The sigmoid flexure of the colon and the rectum adhered in a similar manner to their opposing serous surfaces. The cœcum was thickened, and perforated by a small ulceration, which had been patched up by one of the convolutions of the ileum. On the inner surface of the cœcum there were large sloughy ulcerations with much thickening of the subjacent coat, except where the perforating ulcer existed, and its bed was a portion of sloughy-looking lymph, lying immediately upon the peritoneal coat. The perforation existed at one corner of the ulcer. On the inner surface of the transverse colon there were puckered dark grey cicatrices, and also others, round, depressed, the size of a sixpence. Cicatrization had commenced at the edges and the

centre; but the mucous layer had not been replaced in these situations. About two inches above the sphincter of the anus there was thickening of the mucous coat; and for about an inch in breadth, and throughout the whole circumference of the gut a portion of that tunic had been removed, and the muscular coat was exposed, and presented a shreddy surface. There was no ulceration of the ileum. The other abdominal and the thoracic viscera were healthy.

177. *Chronic Dysentery.—Enlarged Mesenteric Glands.*
— Mucous Coat of the Colon firm and thickened. —
The Cicatrices of Ulcers.

Abraham Johnson, aged twenty-eight, a seaman of the ship "Triumph," suffered from chronic dysentery from July 12th to January 22nd, when he died, much emaciated.

Inspection. — Abdomen. Many of the mesenteric glands were as large as an almond without the shell. The intestines were generally contracted. At the end of the ileum there was vascularity in transverse streaks; but the tunics were sound. The colon was in many places contracted; the mucous surface was in places white, in others dark grey, and slightly roughened; it was firm, and adhered closely to the submucous tissue. There were the cicatrices of several ulcers in the upper part of the colon.

178. *Pleuritis cured, succeeded by Hydrocele radically cured; followed by Rheumatism, succeeded by Dysentery, Cachexia, and Recurrence of Dysentery. — Colon ulcerated.*

Phillip Steer, aged twenty-five, a marine on board Her Majesty's ship "Endymion." On the 25th June, 1841, suffered from an attack of pleuritis for which he was bled largely. On the 22nd July, he was admitted into the European General Hospital with swelling of the left testicle and hydrocele of the same side of ten days' standing. On the 2nd August the hydrocele was tapped and port wine injection was used. On the 23rd August the testicle was nearly well and the fluid had not re-accumulated, but swelling, pain, and heat of the left knee (to which he had formerly been subject), came on and continued at times very acute and with much febrile excitement, treated with leeching, colchicum, and mercurials. After a few days' steady improvement, on the 21st September dysenteric sym-

ptoms came on, and the knee-joint improved more rapidly and he was discharged, free of complaint, though weak, on the 11th October. On board the "Hastings" he became affected with dysentery on the 25th October, and continued under treatment there till the 30th, when he was sent again to the General Hospital. He was reduced in flesh and strength, pulse 120 and very feeble. The tongue apthous at the edges and coated in the centre; the abdomen collapsed, but without tenderness. There had been no return of the pain or swelling of the knee-joint. Sago and port wine were ordered, and an anodyne enema at bed-time. During the night he was purged frequently, the dejections being feculent and lumpy, and passed without griping or straining. Subnitrat. bismuth. four grains, opium one grain, were ordered every four hours. On the morning of the 31st, the purging continued; drowsiness came on with a febrile evening accession. The quantity of opium in each dose of the pills was reduced to half-a-grain, but the drowsiness increased to coma, and he died at 8 P. M. of the 31st.

Inspection twelve hours after death. — The body was much emaciated. The left knee in every respect similar to the right. The left testicle much wasted; no effusion into the tunica vaginalis of that side. — *Chest.* There were firm adhesions of the right lung to the costal pleura. The serous covering of the heart presented a general pearly appearance, with here and there opaque spots very slightly thickened; no enlargement of the heart. — *Abdomen.* The liver was pale and bound to the side by partial peritonitic adhesions. The intestines generally pale and washy-looking, and there were a few ounces of serous effusion in the cavity of the abdomen. The colon presented on its inner surface numerous puckered ulcerations, many of them in process of cicatrization.

In cases of frequently recurring attacks of dysentery appearances are sometimes observed which are best explained on the supposition that under the fatal recurrence the cicatrices of former ulcers have lost their vitality, and assumed the appearance of dark-coloured thin pellicles, some attached, some separating, and some detached. The appearances presented in the two following cases (179, 180.) are best explained in this manner.

179. *Frequent Recurrences of Chronic Dysentery. — Irregular Surface of the Colon. — Pellicular gangrened State of the depressed Portions, probably the Cicatrices of former Ulcerations.*

Phillips, aged 31, private, 4th Light Dragoons, ten years in India. Suffered from fever at Kaira. Admitted 11th June, 1830, with diarrhœa. From that period till 20th June, 1832. was thirteen different times admitted into hospital, either with diarrhœa or chronic dysentery. After last admission he became much emaciated with œdematous feet, sallow skin, and occasional purging. He died 28th September, 1832. During the two years and three months he had been 355 days in hospital.

Inspection six hours after death.—The abdomen contained two pounds of clear straw-coloured serum. The omentum in parts infiltrated with serum, stretched over the intestines, and had formed old adhesions to the left side of the abdominal parietes. The glands of the mesentery and meso-colon were of dark chocolate colour, numerous, enlarged, none however larger than a horse-bean. Neither cœcum nor colon had formed adhesions. The whole large bowels contracted and thickened, had lost to a great degree their cellular character; they hung more loosely in the abdomen than usual, and it seemed as if their natural connections had been lengthened; the serous tunic was pale and washy-looking. The fatty processes of the colon were converted into bladder-looking bodies containing serum. The mesenteric vessels empty, stomach small, mucous coat healthy. The small intestine was for the most part somewhat contracted, with here and there distended portions with thinned coats. The jejunum contained tenacious light yellow mucus. Ileum healthy to within a few inches of its termination, where there was internally a dark red portion, in part sloughy. The inner surface of the large bowels was irregular, a succession of elevations and depressions; the former presented a clear, transparent, uncoloured, mucous surface, edged round with a red line and dotted here and there—the red line, as seen through a magnifying glass, was a succession of small defined red points. From the surface of these elevated parts there did not peel tenacious mucus, as I have generally seen; underneath, the cellular tissue was much thickened. The depressed surface varied in colour, from dark red to black, in patches of various diameter, to an inch and upwards, many of them connected, continuous, winding amongst the elevated parts, and forming the greater extent of the inner surface. From these patches a

tender pellicle peeled easily; the darker the tint the tenderer the pellicle; in one situation it had in part separated naturally. Underneath the pellicles there was a dark red or black, moist, infiltrated surface. Interposed between this infiltrated part and the muscular coat, there was a layer of pale, condensed, cellular tissue. It appeared as if the disorganized pellicle had been the remnants of the mucous tunic or an upper layer of cellular tissue. In the rectum, no irregularity of surface, but it was abraded, of arterial red colour, the tint very varying in depth; it was like a partially washed-out colour in a water-colour drawing. Liver small, with one unnatural adhesion to the left side and when cut into it was somewhat hard, much mottled. Gall-bladder shrivelled, contained some dark-coloured concretions. Spleen healthy. Kidneys small, lobulated. A little serum in the chest and pericardium. Lungs pale. Heart healthy.

180. *Chronic Dysentery.*—*Thickened State of the Colon.*
—*Mammillated Surface of the Mucous Coat, probably from Hypertrophy.*—*Separation of parts of the Mucous Surface in thin gangrened Pellicles.*—*Bright's Disease.*

William Nash, aged twenty-seven, a private of the 4th Light Dragoons, who, since 1830, when he suffered from dysentery, had never been in perfect health; was admitted into hospital at Kirkee on the 6th April, 1832, affected with febrile symptoms. He was actively treated. Palpitation at the epigastrium, which he had occasionally observed since his first illness with dysentery, was noted. The abdomen was also full, and there was uneasiness in the course of the colon on pressure. He was discharged convalescent on the 22nd May, and readmitted on the 28th, having on the previous day been discharged from the convalescent ward. In the night time purging returned with griping, and had continued very frequent since. 30th, strong pulsation at the epigastrium and below the umbilicus. July 30th, pain above the umbilicus, occasional hardness there, strong pulsation. 31st, there is a feeling of hardness in the course of the transverse colon, commencing on the right side of the umbilicus, and extending across the belly and upwards, and towards the left side of the diaphragm, also feeling of soreness there. Died September 4th. Throughout this long illness there were frequent amendments and relapses. Every variety

of treatment was tried. The appearance of the evacuations throughout the disease varied; they are described as follows at different times in the reports:—"sometimes yellow, sometimes slimy; greenish and thin, with some lumps; dark green, watery; thin, watery, bilious with white flocculi; thin, yellow, with some drops of blood; brown, watery, with some specks of blood; pretty consistent, with curdled appearance, tinged with bile; consist of bright yellow granules and flocculi floating in water." They were also frequently feculent and natural.

Inspection six hours after death.—Body emaciated. The omentum vascular, extended over all the bowels, but had not formed any adhesions, and was not thickened. No unnatural adhesions of the cœcum. The colon throughout its whole course was very much contracted, but not connected by unnatural adhesions to adjacent organs, and after reaching the cavity of the liver, doubled down in a direction towards the umbilicus, not however extending so low; thence it doubled upwards, and followed the great arch of the stomach. The descending colon followed its natural course. There were some black patches on the peritoneal coat of the rectum. Parts of the meso-colon and meso-rectum fleshy and thickened, with enlarged glands. The small intestine was much contracted, and—where most dependent, there more discoloured—was lying in the pelvic region, so that for the space of two or three inches diameter every way the lumbar vertebræ had interposed between them and the anterior abdominal parietes, only the mesentery and the blood vessels, with their investing tissues. This space was in part opposed to the umbilicus, and the situation where the strong pulsation had been so long felt. This space was bounded superiorly by the transverse colon laid on the commencement of the jejunum, which latter intestine, after coursing along the right side of the descending colon, joined the rest of the small intestine, which was found on a plane below the last lumbar vertebra. The transverse colon had not entirely lost its cellular character. The mucous and inter-cellular tissues, throughout the whole course of the large bowel, were much thickened, and could easily be peeled from the muscular; the fibres of the latter were pale and healthy. The whole surface of the mucous tunic had an irregular aspect, produced by the elevation of little variously-sized superficial eminences, closely grouped. It resembled nearly the posterior part of the tongue, where the papillæ are broad and flattish, or it might be likened to a surface of closely-grouped superficial warts. The effect was to make the mucous tunic at first sight

look ulcerated, but on nearer inspection the absence of ulceration and the continuity of the mucous surface were apparent. This surface resisted washing or rubbing with the flat part of the finger, but the papillæ peeled off with the nail in the form of thick gelatinous mucus, containing some opaque granules. There was little change of colour, it was greyish throughout the greater part of the membrane. Here and there, internally, more especially at the sigmoid flexure, were black patches half an inch or more in diameter; in parts of some of these there was a breach of continuity. These patches were gangrened portions, very tender, peeling off in the form of a thin pellicle, leaving underneath a reddish ulcerated-looking surface. In some the gangrened pellicle had been altogether thrown off, and left a superficial ulcer with reddish bottom and ragged edge; but this was not in many instances the case. In the rectum there was more of this gangrenous appearance; the patches, however, were less defined. The greater part of the inner tunic of the lower portion of the rectum was occupied by a thin tender pellicle, easily separating, in some portions black, in others less remarkably so. The coats of the small intestine was thinned; the bowel contracted. In parts, however, of the lower portion of the ileum there were partial distentions, sometimes only of one-half of the diameter of the gut. There was redness of part of the mucous lining of the ileum, but no proof that it was the result of inflammation; contents green, tenacious. The stomach, distended with air, seemed sufficiently healthy. The liver had formed no unnatural adhesions; it was somewhat darker in its colour, and internally somewhat more mottled than natural. The gall-bladder contained dark bile. The cortical part of both kidneys had partially undergone yellow degeneration. The lungs on both sides adhered firmly, but their structure was sufficiently healthy. The heart was healthy.

II.

The Complication of Inflammation, or its Results, of the Mucous Membrane of the Large Intestine, with Peritonitic Inflammation, general or partial. — Under this head are included, 1st, those cases of general peritonitis terminating in vascularity of the membrane, deposit of flakes of lymph on its surface, or sero-purulent effusion, traceable perhaps, in some cases,

though certainly only in a small proportion, to rupture of an ulcer and consequent escape of part of the contents of the intestine into the sac of the peritoneum. It is remarkable how very generally perforation of the intestinal wall, from sloughy or other ulceration, is patched by adhesions, and effusion in this manner prevented. (Cases 147. 169, 170. 176. 181, 182. 188. 197. 242. 272, 273. 314, 315.)

2nd. Those very frequent instances of partial peritonitis which cause adhesions of the omentum over the transverse colon or the cœcum, to the margin of the liver or to different parts of the peritoneal lining of the abdominal walls, — the most common being over the transverse colon, and in the neighbourhood of the cœcum. (Cases 141, 142. 144. 149. 169. 197. 242. 254. 257. 272.)

The first complication, when not dependent on effusion into the peritoneal sac, will be found, I think, generally to occur in persons who have suffered for some time from dysentery, have been previously in indifferent health, or who not having had the advantage of appropriate treatment at its commencement, have experienced an exacerbation of inflammatory action terminating in a sloughy condition of the mucous membrane.

The second complication most frequently takes place in acute attacks, and is generally associated with thickening of the walls of the intestine, and sloughy ulceration of the mucous coat in transverse bands. Sometimes, as a result of omental adhesion, a tight band passing over the cœcum, and adherent to the iliac fossa, is found, calculated by its pressure to obstruct the passage through the gut. The following cases from 181. to 187. illustrate these observations; as do also 141, 142. 144. 149. 169.

181. *Sloughy Ulceration of Colon. — General Peritonitis and Matting of the Omentum.*

Shaik Abdoolla, a Mussulman sailor of twenty-two years of age, using spirituous liquors moderately, but not opium, was, after four months' illness with bowel complaint, admitted into hospital on the 23rd August, 1850. He was much reduced. The abdomen was full and soft, and painful on pressure at the umbilicus. The tongue was moist and slightly florid. The pulse was 76, small, and easily compressed. He continued under observation till the 21st September, when he died. During that time the bowels were opened from six to ten times in the twenty-four hours. The evacuations were scanty, thin, yellowish, greyish, or greenish feculence tinged with mucus and blood, and passed with griping and straining. There was occasional evening febrile exacerbation. The countenance became pinched, the feet œdematous. The urine was of low density, but showed no traces of albumen. He was treated with opiates, astringents, and the application of small blisters, sago, milk, and wine.

Inspection seven hours after death. — Chest. On opening the chest both lungs were found fully collapsed. No effusion into the sacs of the pleura, nor any adhesion observed. There was some degree of emphysema of both lungs at their thin edges. The lungs were spongy in every part. Some degree of redness of the mucous membrane of the bronchial tubes was observed, but no dilatation. — *Heart.* There were opaque points of deposit on the inner surface of the aorta; also on the aortic valves, but not to the extent of injuring their pliability. — *Abdomen.* About eight or ten ounces of serum were effused into the cavity of the abdomen. There was a blush of dotted redness on the peritoneal surface of several of the convolutions of the small intestine, with effusion of flakes of lymph. The omentum, vascular and matted over the transverse colon, had a sloughy appearance at one part — that over the hepatic flexure of the colon; and under this sloughy part there was an ulcerated opening into the intestine. About the omentum, and also over part of the mesentery, there were greyish flakes of lymph deposited. — *Pelvis.* There were five or six ounces of serum in the cavity of the pelvis. Its peritoneal lining, including that covering the fundus of the bladder, was covered with thick, yellowish flakes of lymph. The mucous membrane of the large intestine presented numerous ulcerations; some of them with soft and granular surfaces; in others more or less cicatrization had taken

place. The opening at the hepatic flexure of the colon was about the size of half a rupee. The kidneys were healthy. Liver of natural consistence and structure, but rather pale. The spleen was not enlarged. The brain was healthy.

182. *Sloughy Ulceration of Large Intestine without thickening — Commencing Abscesses in Liver.—Peritonitis.*

Private W. H., aged thirty-eight, of Her Majesty's 40th Regiment, after two days' illness, was admitted into hospital at Belgaum, on the 14th July, 1830. There was purging, with much pain and tenderness in the course of the colon. Pulse full, frequent, and sharp. He was freely bled and leeches, and was free of pain for some days, but the purging continued, attended with tenesmus. The dejections contained neither mucus nor blood, but were watery, light-coloured, fœtid, and filmy. On the 23rd there was again tenderness of abdomen. The symptoms continued unaltered. He died July 27th. No ptyalism induced.

Inspection. — The omentum adhered to both iliac fossæ. The peritoneal covering of all the intestines was vascular and in some places covered with effused lymph. The ascending colon and commencement of the transverse arch adhered to the concave surface of the liver. The mucous membrane of the large intestine was ulcerated in many places. In the cœcum one ulcer had perforated the coats of the bowel, but effusion was prevented by adhesion to the abdominal parietes. Some of the ulcers had the appearance of commencing cicatrization, and were covered with firmly adhering yellowish shreds. In no situation were the coats of the intestine thickened; on the contrary, they were generally thinner than natural. The liver more compact and tougher than in the healthy state was externally of olive colour, and in its substance some points of purulent effusion were observed. The gall-bladder was shrivelled and nearly empty.

183. *Sloughy Ulceration and thickening of Large Intestine. — Matting of Omentum.—Dysuria.—Peritonitis of Bladder.*

Private J. T., of Her Majesty's 40th Regiment, twenty-six years of age, and of slight make, was, after two days' illness, admitted into the hospital at Belgaum on the 30th May, 1830. He complained of tenesmus, and passed frequent scanty dejec-

tions, which contained blood and mucus. There was not any febrile excitement or tenderness of abdomen. He gradually improved, and was discharged free of complaint on the 14th June. He was readmitted on the 18th June, with a return of his former symptoms. Still neither pain nor tenderness of abdomen. On the 22nd, however, slight tenderness of the right iliac region was present, but it was removed by the application of a few leeches. On the 26th he complained of dysuria. On the 27th the dejections were brown and watery. He gradually sank without return of pain of abdomen, and died on the 30th June. Ptyalism had not been induced.

Inspection.—There was evidence that extensive inflammation of the peritoneum had existed. The colon and rectum adhered to every organ in contact with them,—the former to the under surface of the right lobe of the liver; the latter, by more recent adhesions, to the urinary bladder, and to the pelvis wall at the symphysis pubis. The large intestine throughout its whole course was thickened. The mucous membrane was much ulcerated, and had in many places a gangrenous appearance. The omentum was drawn down like a cord of small vessels, and adhered firmly to the cœcum.

184. *Much Sloughy Destruction of the Colon.—Peritonitis and Matting of the Omentum.—Former Attack of Hepatitis.—Puckered fibrous Bands in Liver.*

Private B. M., aged twenty-seven, of Her Majesty's 40th Regiment, was admitted into hospital at Belgaum, on the 22nd July, 1830. He had been ill in hospital with hepatitis from January 16th to January 24th. Had been well ever since, till three or four days before admission, when he became affected with purging of mucous and bloody dejections, and with tender abdomen. He died on the 6th August. No ptyalism. Tender gums.

Inspection.—The whole omentum, vascular, thick, and fleshy, embraced firmly the colon from the cœcum to the sigmoid flexure; and on attempts being made to separate it, the contents of the bowel escaped. In some places, where covered by the omentum, the natural coats of the intestine were entirely destroyed. All the intestines, great and small, were connected together in one mass, and adhered to the parietes of the abdomen. The liver was smaller than natural. Its whole surface both convex and concave was covered with depressed and puckered cicatrices, which, when cut into, were found to be firm

and membranous. The liver adhered slightly to the diaphragm.

185. *Thickening of the Colon. — Numerous deep Ulcers. — Matting of the Omentum. — Liver with fibrous puckered Bands.*

Private J. P., aged thirty-one, of leuco-phlegmatic habit, was admitted into hospital at Belgaum, on the 27th of June, 1830, with ophthalmia, which terminated in obstinate opacity of the cornea with interstitial ulceration. While under treatment for ophthalmia, he complained for the first time of dysentery on the 9th of October; but it was ascertained that he had been ill during the two days preceding. The symptoms were urgent. The dejections, very frequent, mucous, and bloody, were passed with griping and tenesmus, and there was tenderness in the course of the colon. The skin was hot and dry, and the pulse frequent. He was treated in the usual way. Ptyalism was not induced. He died on the 15th of October.

Inspection.—The omentum spread over the intestines adhered firmly to the cœcum, where that intestine was united by unnatural adhesions to the iliac fossa. At the points of adhesion the coats of the cœcum were black and tender. The walls of the large intestine, which were in general thickened, were, at the upper portion of the ascending colon, quite cartilaginous. The mucous membrane was ulcerated. The ulcers were numerous, defined, and deep. The liver was natural in size, but hard and much mottled; there were few adhesions; but the peritoneal covering of the organ was thickened and of pearly colour. Old firm adhesions attached the gall-bladder to the colon. Around the situation of the gall-bladder and elsewhere the liver had a puckered depressed appearance, as if from the adhesion of the surfaces of the cyst of an abscess. In these situations the structure of the liver was almost cartilaginous. At one side of the gall-bladder a thin layer of the liver was prolonged for a short distance over the free surface of the bladder. The gall-bladder contained numerous earthy concretions. In the chest the costal and pulmonary pleuræ were connected by old adhesions.

186. *Thickening and Sloughy Ulceration of Large Intestine. — Matting of Omentum. — Congestion of the Liver.*

Private M. C., Her Majesty's 40th Regiment, aged twenty-

eight, after suffering for thirteen days from pain in the epigastrium and right hypochondrium, on motion and pressure, was admitted into hospital at Belgaum on the 26th June, 1830. His bowels had generally been confined, but he had been purged the day before admission. The purging became more frequent. The dejections contained mucus and blood, then finally became watery and of a reddish brown colour. He sunk, and died July 5th. No ptyalism induced.

Inspection.—The colon was distended and its peritoneal covering was vascular, and had contracted adhesions. Those between the cœcum and right iliac fossa were pale and firmly organized. The omentum was very vascular and adhered by one corner to the caput cœcum and right iliac fossa, so that the commencement of the transverse arch of the colon was drawn down towards the right iliac region, and a bend was produced in the course of that intestine. The ascending colon was more diseased than the rest of the intestine and it adhered to the gall-bladder. The mucous membrane of the cœcum, ascending colon, and transverse arch, was not vascular, but thickened, and presented an irregular and softened surface, resembling the walls of a tubercular excavation. The liver was much enlarged, and contained much blood, but was free from adhesion or abscess. The gall-bladder was full of bile.

187. *Habitual Constipation.*—*Colon contracted in Parts and strictured by a Band of the Omentum.*—*Tubercular Infiltration of the Lungs.*—*Ulceration of the Ileum and Cœcum, probably from Softening of Tubercles.*

A lady of strumous habit and feeble conformation, aged about twenty-two, had, whilst in England, for some years before her departure for India, suffered habitually from constipation, sometimes urgent, attended with fulness and pain in the right iliac region, supposed to be caused by fecal accumulations. Laxatives and purgatives had been used, and occasionally a blister applied to the tender part. Enemata were stated to have been regularly had recourse to for some time, but with bad effect. They distended the bowel, and seemed to impede its action. In January, 1834, after a year's residence in Bombay, in the enjoyment of comparatively good health, this lady became the subject of a severe attack of dysentery, for which, about the end of February, she was sent to the Mahabuleshwur Hills. She was pale, weak, and very much reduced, the bowels acted irregularly, sometimes loose, and irritable, — the dejections being

watery, and containing mucus, — at other times confined for two or three days in succession, and then relieved by sudden and copious evacuation. Under the occasional application of counter-irritation, and the almost habitual use of the aloes, and myrrh mass, sulphate of iron, quinine, extract of hyosciamus, ipecacuanha, and extract of gentian, in various proportions and forms of combination, favoured by the climate, the symptoms were much alleviated, and the general appearance much improved. The monsoon was passed at Poona, where her bowels were more irritable and relaxed, and where she latterly experienced frequent attacks of dyspnœa. This lady, much emaciated, returned to the Mahabuleshwur Hills on the 31st of October. It would be tedious to enter into the detail of the symptoms which followed: there was increasing emaciation, the bowels were irritable, the evacuations being occasionally copious and followed by sense of faintness, and dragging at the epigastrium; there was at different times acute tenderness of the abdomen, without distension, and the tongue was florid; there was, however, no return of dyspnœa. Counter-irritation was used, and opiates were freely exhibited: she died on the 24th November.

Inspection seven hours after death. — The body was much emaciated, and the abdomen collapsed. — *Abdomen.* The stomach was small and contracted. A band of the omentum reached from the first third of the transverse colon, passed across the cœcum, and adhered to the hollow of the os ilium. Underneath the peritoneal coat of the end of the ileum, there were small miliary tubercles, and underneath that of the cœcum, the tubercles were numerous, and of the size of a pea. The coats of the cœcum were much thickened, and there was adhesion to the hollow of the os ilium. At the hepatic flexure, the colon was contracted, and formed a double angle, it then passed obliquely upwards to the left, became applied to the cardiac end of the stomach, and to the diaphragm; thence it doubled acutely downwards, and formed the descending colon, considerably contracted, but without thickening. The rectum and the sigmoid flexure of the colon were dilated. On the inner surface of the ileum close to the ilco-colic valve, there was a ragged ulceration, the size of half a crown, with edges dark red, elevated, rounded, and centre irregular. The inner surface of the cœcum presented an irregular hard fungoid surface: the elevated parts coursing in transverse bands with an occasional intersection of longitudinal ones; their colour was dark red, grey black, in parts ink black; the colouring matter infiltrating deeply the

thickened tissues. The mucous coat of the ascending colon was of a dark red colour, and much softened. The mesenteric glands were enlarged, and had undergone tubercular degeneration. — *Chest.* Both lungs contained tubercular masses in a crude state, and adhered to the costal pleura at the points of tubercular deposition. Around the tubercles the substance of the lung was quite healthy, and collapsed; so that the tubercles were thrown in relief, from the surface of the lung.

III.

Tumefaction in the Region of the Cæcum or Sigmoid Flexure of the Colon. — The first is the more common, and is caused by matting of the omentum over the cæcum with more or less thickening of the coats of the latter, or by thickening of the coats of the cæcum without adhesions of the omentum (188. 239.). It may be caused also by intus-susception of the ileum. In one case (189.) perforation of the cæcum and effusion of its contents into the cellular tissue surrounding the gut, followed by gangrene of the abdominal walls, took place.

The opinion that cæcal tumefaction is in India frequently caused by fæcal accumulation, is altogether unsupported by my experience; and belief in the frequent occurrence of this morbid condition has, to my knowledge, led to serious errors in practice.

188. *Chronic Dysentery.* — *A palpable Tumour of the Cæcum.* — *The Lungs studded with Tubercles not suspected during Life.* — *Considerable Effusion of Serum in the Head.*

Patrick Fox, aged forty-two, a pensioner, emaciated and of broken constitution, was admitted into the European General Hospital, on the 8th March, 1839. He had served twenty-three years in India, had been pensioned two years and a half, and had, he said, generally enjoyed good health. On admission, he stated that since the 10th of January, he had been affected with purging, that at first the evacuations were scanty and slimy, but that latterly they had become watery, and that he had not used any remedies. The abdomen was not distended,

but it was somewhat tense, and on pressure in the course of the colon, there was tenderness, and over the cœcum a distinct defined hardness. The pulse was ninety-two and small, the skin cool, the tongue, coated yellow, was rough in the centre and florid at the edges and tip. It would serve no useful purpose to follow in detail the gradual decline of this case, or the varied and ineffective treatment that was followed. There were in general eight or ten pale yellow watery, sometimes frothy evacuations passed in the twenty-four hours; they were characterized by dysenteric fœtor, but were unattended by either griping or straining. At no time was there cough, or other pectoral symptoms complained of. He died on the 22nd.

Inspection sixteen hours after death.—*Head.* About three ounces of serum in the cavity.—*Chest.* The lungs collapsed partially. There were old adhesions of the upper lobes of both sides, and a good deal of puckered irregularity of the external surface of the lung, at the site of these adhesions. Both lungs and all the lobes were more or less studded with small grey tubercles, the size of a mustard-seed. At the posterior part of both lungs, these tubercles had become so numerous and aggregated, that the tissue was almost impermeable. On the anterior part of the lungs they were scattered with considerable intervals. Here and there, there was a small cavity, the size of a pea; and there were one or two nodules which when cut presented a pearly cartilaginous appearance.—*Abdomen.* The coats of the cœcum were about half an inch thick, firm and cartilaginous, with round tubercular deposition, intermixed. The inner surface ragged and ulcerated, and a perforation on the anterior aspect was patched up by the omentum. The rest of the colon was little diseased. The liver was pale, mottled and softened. The stomach was healthy; so were the kidneys.

189. *Dysentery.*—*Perforation of the Cœcum, with consequent Formation of a circumscribed Sac, with Gangrene of the Muscles and Integuments.*

— Walker, private of Her Majesty's 6th Regiment, aged twenty-eight, after six days' illness, was admitted into hospital with dysentery, and died after a month. The bowels were generally very loose, and the dejections frequently contained clots of blood with dysenteric fœtor. The pulse was feeble and the skin damp. Latterly there was much defined fulness over the cœcum.

Inspection.—There was fulness of the right iliac region, with

a dark gangrenous patch of the integuments about three inches in diameter; and underneath, the muscles were found in a gangrenous state. Over the cœcum, there was a circumscribed sac about the size of an ostrich egg; the inner surface dark olive green, fœtid, and sloughy; the contents of the sac were dark olive green, watery, fœtid,—the evident contents of the cœcum which communicated with the sac by an opening of an inch and a half in diameter.

IV.

Displacements of the Colon — are, 1st, of the commencement of the transverse arch. This is very frequent, and is produced by adhesion of the omentum to the cœcum or iliac fossa, causing that portion of the intestine to double down in the line of the ascending colon. 2nd. The transverse colon passing in the line of the great arch of the stomach, adherent to the left side of the diaphragm, and then doubling acutely down to form the descending colon, is a form of displacement occasionally observed, but not nearly so frequently as the one first described. I have witnessed it in four cases. 3rd. The sigmoid flexure dragged to the right, and adherent to the brim of the pelvis or to the bladder, is a displacement, also caused by adhesions, but it is not very common.

I would refer to cases 142. 149. 152. 156. 164. 167. 169. 259. 266. 278. 314, 315., as affording illustrations of various displacements of the colon.

V.

Complication of Ulceration of the Mucous Lining of the Large Intestine, with Abscess in the Liver.—This complication is very common; but the subject will be more appropriately considered in a subsequent chapter in connexion with hepatitis and hepatic abscess.

VI.

Complication of Dysentery, with Morbid Lesions of the Small Intestine or of the Stomach.—When the small

intestine is affected, the morbid changes will be generally found at the end of the ileum. They consist of ulcers more or less circular, originating in Peyer's glands; or in increased redness, with granular exudation, as already stated. (Cases 131, 132, 141, 144, 145, &c.)

Chronic gastro-enteritis is a sufficiently common form of disease in India in cachectic individuals, more particularly natives; but my opportunities of studying the morbid anatomy of this affection have been limited. I am therefore unable to say to what extent the intestinal symptoms are due to inflammation of the mucous membrane at the end of the ileum alone, or to complication with inflammation of the mucous membrane of the large intestine. To this inquiry I would venture to invite the attention of the Indian pathologist.

In the two following cases which have come under my observation, I find circular ulcers of the stomach associated with similar ulcers of the colon.

190. *Circular Ulcers with Sloughs in Mucous Membrane of Colon and Stomach.—No Thickening.*

Mahadoo Mallee, a Hindoo flower-seller, of thirty-five years of age, of feeble constitution, in destitute circumstances, and often exposed to vicissitudes of weather, and occasionally indulging in the moderate use of spirits, was, after twelve days' illness, admitted into hospital on the 22nd June, 1850. During that time he had suffered from relaxed bowels; the evacuations at first had been thin and feculent, but latterly had shown traces of blood and mucus, and were attended with tenesmus and sometimes with prolapsus. Such continued to be their character during the time the patient was under observation. On admission the lungs and heart were found to be healthy. There was some fulness of abdomen, but no induration. There was no febrile disturbance. The pulse was small, feeble, and easily compressed. The tongue was clean, moist, and pale. These symptoms continued with little change till the 25th, when the bowels became more relaxed; he sank rapidly, and died at 9 P.M. of that day. He was treated with quinine, in three-grain doses,

combined with a grain each of ipecacuanha and blue pill, and latterly half a grain of opium, every fourth hour; and had milk, sago, and wine, as diet.

Inspection seventeen hours after death.—*Chest.* The lungs were collapsed and crepitating, but in parts old adhesions united the costal and pulmonary pleuræ of both sides. The heart was of healthy size and structure.—*Abdomen.* There was a small quantity of serous fluid in the peritoneal cavity. The liver was healthy in size and structure. The spleen was healthy. There were five or six patches of ulceration in the mucous membrane of the stomach; one or two of them were quite circular, with dark yellow or brownish sloughs in the centre; the others were larger, and more or less irregular, but also had central sloughs attached to them. The mucous membrane at the cardiac extremity of the stomach had a dark brown marbled appearance, but its substance was not soft. The mucous membrane of the large intestine, from the rectum to the cæcum, was studded with ulcers, with dark-grey sloughy surfaces of different sizes, the smallest being circular, and the larger irregular. There was no thickening of the coats of the intestine, and the mucous membrane was not more firmly adherent to the subjacent coat than natural. No ulceration of the mucous membrane of the end of the ileum. The kidneys were apparently healthy.

191. *Gray Softening, with a few Ulcers of the Mucous Lining of the Stomach and Colon. — Cicatrices of Ulcers in the former.*

John Knapp, a private of the 4th Light Dragoons, aged twenty-two, who had suffered twice from dysentery in the year 1830, was, after two days' illness, admitted into the hospital at Kirkee on the 17th April, 1832. The evacuations were scanty, frequent, of light colour, tinged with blood, and passed with griping and tenesmus. The iliac regions were tender on pressure. The tongue was coated in the centre and florid at the edges. There was occasional retching and vomiting and frequency of pulse. He died on the 22nd. He had been bled; a blister was applied to the epigastrium; mercury with opiates was given. The mouth was sore, but there was no salivation.

Inspection.—There were not any traces of peritoneal inflammation, and no distension of the bowels. The mucous membrane at the end of the ileum was somewhat vascular, perhaps thinner, and peeled easily off with the nail. There was one ulcer in the cæcum about the size of a silver penny, not deep, and unsurrounded by thickening or vascularity. The mucous lining of

the great intestine throughout, perhaps thicker than natural, of a light ash-grey colour, was here and there dotted red, and peeled off readily with the nail in shreds. The contents of the large intestine were green and feculent. The mucous membrane of the stomach, thickened and somewhat softened, presented here and there an ash-grey dotted red appearance, with the marks of one or two small ulcers cicatrizing. The small intestine was not opened, with exception of the end of the ileum. The liver was healthy. The gall-bladder was full of good bile. The thoracic viscera were healthy.

VII.

Coexistence of Enlargement of the Mesenteric Glands with Dysentery.—An enlarged, reddened, and somewhat succulent state of the mesenteric glands is not unusual in dysentery, depending, it may be supposed, on the increased afflux of blood through the mesenteric arteries, which is probably present in this disease. These glands were enlarged in cases 141, 142. 147. 165. 177. 179. 202. 254. 277.

Part of the Intestine chiefly affected.—On this point observers have somewhat differed in their statements. In fact, the tendency of the inflammation is to affect the entire mucous surface of the large intestine. In some cases it is general; in others present in greater degree in one portion than another, but very seldom exclusively limited to a particular part. The situation of the disease is noticed distinctly in forty-six of my fatal cases. Of these it is described as general in twenty-four; as predominant in the cæcum and ascending colon in fifteen; in the cæcum and transverse colon in three; in the cæcum and rectum in one; in the cæcum and sigmoid flexure in one; and in the transverse colon in two.

Concluding Remarks.—Such, then, are the observations which I have to offer on the morbid anatomy of this important disease. I have made no reference to

microscopic inquiry, for I have not any information from this source to communicate. Dr. Baly, if I mistake not, states that the microscopic appearances of the contents of the solitary glands are peculiar, and may serve to distinguish them from those of the ordinary follicles and from exudation matter. If so, then this means of inquiry will be of use in determining the question of relative frequency of affection of these two glandular structures. The microscope will also, no doubt, give precision to descriptions of the exudation matter on the surface and in the interstices of the membrane, and may point to inferences of which, in the present state of our knowledge, we have as yet no idea. Still, making full allowance for all this, and not estimating lightly the addition of positive facts to our knowledge, however unimportant they at first sight may appear, I must frankly avow that I do not anticipate much increase to our practical acquaintance with dysentery from this mode of inquiry; and I would venture to caution the young pathologist, when engaged in the investigation of minute detail, to take care that his mind does not lose the grasp of large principles of Pathology, Etiology, and Therapeutics.

SECTION III.

ETIOLOGY OF DYSENTERY. — IMPORTANCE OF DISTINGUISHING EXCITING AND PREDISPOSING CAUSES. — EXCITING CAUSES. — COLD, FOOD, PREDISPOSING CAUSES. — CACHECTIC STATES. — ACTION OF MALARIA DISCUSSED.

AT the commencement of my account of the pathology of dysentery, I referred to certain theoretic analogies between inflammation of the skin and that of the intestinal mucous membrane. And now, on entering upon the consideration of the causes of dysentery, these ana-

logies again necessarily suggest themselves to the mind. I shall therefore allude to them in the first instance, in order that hypothetic opinions may be distinctly separated from more positive knowledge.

It is believed that some inflammations of the skin are caused by the reception into the blood of specific poisons, —such are the eruptions of measles, small-pox, scarlatina. To apply a similar theory of causation to some forms of dysentery, and to invest them with contagious or infectious properties, is quite within the limits of rational speculation. But it may be very safely affirmed that as yet such opinion is altogether unsupported by facts.

Again, it is sufficiently probable that the influence of a specific poison, or of blood vitiated by retained or altered excretions, may be operative in causing other cutaneous inflammations, as erysipelas, or some of the squamous, vesicular, and pustular eruptions; and that such theory may also be reasonably applied to some forms of dysentery. But it is not pretended that every inflammation of the skin is caused in one or other of these ways; therefore it cannot be fairly assumed of dysentery.

Satisfied with this general allusion, I now pass from these theoretic questions to a statement of what I believe to be our more certain knowledge of the causes of dysentery.

We must, in the first place, keep before us the distinction of exciting and predisposing causes; for neglect of this simple principle has led to much of the confusion which exists respecting the etiology of this disease.

Exciting Causes. — The most common exciting causes are those atmospheric states by which the temperature of the surface of the body is apt to become unduly or suddenly depressed. They consist, as is well known, of

absolute lowness of atmospheric temperature, of considerable diurnal ranges, of much moisture of atmosphere, and of currents of dry or humid air. The influence of these atmospheric states is very frequently favoured by imprudent exposure; and in order to its right appreciation as an exciting cause of dysentery, we must always bear in mind that lowered capacity of generating animal heat which exists in tropical climates, and to which I have already alluded in my introductory observations.

When I turn to my hospital experience, I find that the proportion of admissions from dysentery is greatest in those months of the year in which the atmospheric state is most likely to be one or other of those which I have just described; and in this category I am careful to include June and November,—months in which marked atmospheric changes occur in Bombay. In June the hot season terminates; the rains begin to fall, and humid winds to blow. In November the sultry heat of October ends, and north-easterly-winds set in. The following statement shows the proportion of admissions from dysentery per cent. of the total admissions in the European General Hospital, and the Jamsetjee Jejeebhoy Hospital at Bombay, in different seasons of the year:—

	European General Hospital.	Jamsetjee Jejeebhoy Hospital.*
<i>Cold months.</i> —November, December, January	10·8	10·2
<i>Wet months.</i> —June, July, August	7·0	10·7
Transition from cold months.—February,		
March	6·3	6·4
Transition from rains.—September, October	5·4	8·9
<i>Hot months.</i> —April and May	5·1	7·2
Annual proportion	7·4	9·1

* This column gives the proportion of dysentery and diarrhoea combined.

That excesses in *diet*, and the use of unsuitable articles of food, occasionally act as exciting causes of dysentery, may be admitted; but I believe that their operation as such is very limited.

That fæcal accumulation in the large intestine, and the presence there of what are usually termed vitiated excretions, may act as the exciting causes of dysentery, is sufficiently probable; but my observations are in no respect confirmatory of the opinions of Annesley and other writers relative to the frequency and importance of these causes. They are much more in accordance with that of Dr. Mackinnon, who doubts the frequency of fæcal accumulation as a pathological state in India. *

It is of importance that future inquirers should determine this question, on which I find myself at variance with former observers; for the influence of the opposite opinion has led in India, as it seems to me, to an injurious use of calomel and purgatives, not only in the treatment of dysentery, but of disease in general.

Predisposing Causes.—The action of the exciting causes of dysentery cannot be rightly understood or justly appreciated unless we have a distinct apprehension of those altered predisposing states of the system which favour the influence of exciting causes, and without which it would very frequently be altogether inoperative. Therefore, in order truly to discover the causes of dysentery, it is not sufficient that we are told of the atmospheric states to which the affected have just been exposed, or of the food, clothing, and housing with which they have been lately supplied. It is quite as necessary that we should be informed whether or not, and in what degree, they have been *previously* exposed to those

* Treatise on Public Health, &c. By Dr. Mackinnon, p. 314.

various well-known influences designated predisposing causes, which are fully as essential to the development of the disease as the application of the exciting cause itself.

I now proceed to explain very briefly these predisposing states in reference to dysentery.

The European lately arrived in India, consequent upon the exhausting effects of elevated temperature, or on the want of adaptation of food and habits to the altered assimilation and elimination caused by climate, has a state of predisposition to disease engendered; and the influence of the exciting atmospheric states is often still further favoured by imprudent exposure of the perspiring surface of the body. It is under these circumstances that the sthenic, and, I may add, the erysipelatous form of dysentery, are produced in Europeans in India.

All *cachectic states* of the system, however induced, are very predisponent to dysentery. So much so, that when they are present in considerable degree, a very slight exciting cause is sufficient; and when present in great degree, inflammation of the intestinal mucous lining is apt to arise, almost without appreciable exciting cause, — being, as it were, the closing act of the cachexia. Let me point to some illustrations of this position.

There is no more common cause of cachexia in India than malarious influence, and recurrences of malarious fever. We consequently find that whenever persons cachectic from malaria, are exposed to atmospheric states, which depress the temperature of the surface of the body, dysentery becomes prevalent and very fatal. I have already, in reference to the mortality from intermittent fever (page 33.), quoted illustrations of this

etiological law, which have passed under my own observation, and it would be easy to add to their number. For example, I might instance the experience of the Himalayan Hill Sanataria, as set forth by Mr. Grant and Mr. Green in their papers * on Hill Diarrhœa and Dysentery.

Again, exposure to continued elevation of temperature, habitual residence in an atmosphere vitiated from excess of carbonic acid or the effluvia of decaying vegetable or animal remains, or too much moisture will induce cachexia; so will also the habitual use of food defective in quantity or quality, intemperance of all kinds, too much bodily fatigue, and the influence of depressing passions, as anxiety, fear, &c. A cachectic state may also arise from long-continued disease of any kind, from injudicious and too-prolonged antiphlogistic medical treatment, from mercurial influence, and the poison of syphilis, &c.

The occurrence of dysentery in crowded barracks, transport ships, jails, standing camps, besieged garri-sons, beaten and retreating armies, are illustrations of the importance of considering cachectic states in our explanation of the causes of dysentery. There can also, I apprehend, be little doubt that close inquiry into the history of the kind of events to which I have just referred will always clearly demonstrate the influence of atmospheric states consequent on defective clothing and houses, as an exciting condition of the disease. The acknowledgment of this law also renders unnecessary the use of such terms as *camp*, *jail*, *scorbutic*, and *hill* dysentery.

But before leaving the consideration of the causes of

* Indian Annals of Medicine, Nos. i. and ii.

dysentery, there is still an important question to be discussed. I cannot pretend to name all the able writers who have reckoned malaria — the exciting cause of intermittent and remittent fever — as an exciting cause of dysentery also ; but, amongst later authors, Dr. R. Williams, Dr. Baly, Haspel, Mr. Hare, and Mr. Grant may be mentioned.

I have already endeavoured to explain the relation in which malaria seems to me often to stand to dysentery, — that it is a common predisposing cause.

There is nothing in my own observation of disease in India that has ever suggested to my mind the idea that malaria acts as an exciting cause of dysentery* ; and of the statements which have been adduced in support of the contrary opinion, some have seemed to me inconclusive, and others much better explained under the view of a predisposing influence from malaria.

It would be foreign to the objects of this work to enter into a critical examination of the arguments of those who consider malaria to be an exciting cause of dysentery. Indeed, the statements made are so frequently wanting in precision, that I doubt very much whether practical profit could arise from engaging in such an inquiry. Yet I may allude to some points which fail to make that impression upon my mind which they seem to do upon others.

1. The fact that fevers and dysentery prevail in the same divisions of the Indian army, is not necessarily

* On the contrary, the 4th Dragoons, who suffered much at Kaira from malarious fever, were little affected with dysentery there. At Belgaum dysentery is a frequent and fatal disease ; malarious fevers not so. Of the dockyard peons, so frequently under treatment in my clinical ward with malarious fevers, only two were received ill with dysentery.

confirmatory of identity of cause. Those who argue otherwise forget that a "division" may refer to an extensive tract of country, and may present in different localities considerable variety of climate and of physical features. Moreover, in the kind of statements to which I now refer, mention is not generally made of the months or seasons of the year in which these two diseases have respectively prevailed; hence we are left in ignorance whether the prevalence of both diseases has been in the same or in a different season. Again, the character of the fever is frequently not stated; for example, Dr. R. Williams, in his work on *Morbid Poisons**, places the Presidency division of the Madras army first in his list of illustrations of the prevalence and identity of cause of paludal fever and dysentery in the same district. Now, if I mistake not, this division of the Madras army is singularly free from malarious influence; and of the registered fevers the larger proportion is febricula, and not malarious fever.

2. Complication of intermittent or remittent fever with dysentery, has been of rare occurrence in my own field of observation, but it would seem not unfrequently to present itself in other provinces of India and in other countries, and there to be accepted as evidence that idiopathic dysentery is caused by malaria. In this conclusion, however, I am unable to concur. Elsewhere in this work it has been shown that remittent fever in the natives of Bombay is often complicated with pneumonia, but it has never on this account been inferred that malaria is an exciting cause of idiopathic pneumonia; yet, the conclusion would be quite as logical as that which has been drawn with reference to dysentery from analogous premises.

* Volume ii. p. 540.

3. When a person, tainted with malaria, becomes affected with dysentery, sometimes the symptomatic febrile phenomena evince a periodic character, and occasionally the dysenteric symptoms show a similar tendency; but in this we have no evidence that malaria has been the exciting cause of the dysentery. A similar order of events has been observed in other inflammations, as well as in injuries in the same kind of constitution. Though a staunch advocate might still insist that malaria may be the exciting cause of these other inflammations also; yet he will hardly maintain that the contused wound or fractured limb—which, equally with dysentery, may be accompanied by symptomatic fever of periodic character—can be thus accounted for.

4. Nor does the alternation of febrile accessions with symptoms of dysentery or diarrhœa—occasionally observed in persons tainted with malaria, and previously affected with intermittent fever—imply that malaria has been the exciting cause of the dysentery. The alternation of dysenteric symptoms with those of chronic laryngitis, of pulmonary affections, and of rheumatism, has from time to time come under my observation; but such facts have not been held necessarily to indicate identity of cause of these several affections.

5. Mr. Grant, in his interesting report* on the prevalence of dysentery and diarrhœa in the Himalayan Hill Sanatoria, while he attributes much to the cold moist atmosphere of these stations, yet believes that malaria is also influential as an exciting cause. The chief argument which he adduces in favour of this opinion is, that in other hill stations possessing analogous climates, as regards temperature and moisture,

* Indian Annals of Medical Science, No. i. p. 311.

this tendency to dysentery has not been observed. Nainee Tal, Murree, Darjeeling, the Neilgherries, and Mahabuleshwur, are instanced as hill localities which enjoy this immunity. In respect to the four first stations I am not aware whether the experiment has been made of exposing cachectic persons to the influence of their cold, moist atmosphere, but in respect to Mahabuleshwur I know that the result has been similar to that so ably detailed by Mr. Grant, relating to Kus-sowlie, Subathoo, Simla, and Dugshai.

The sanatory station on the Mahabuleshwur hills was established with the view of benefiting the health of the sick European soldiers of Poona and Bombay. The experiment was made in 1829. The selected invalids were sent to the hills at the end of October, or commencement of November, with the following result:—The tendency of dysenteric and hepatic affections to relapse, and of soldiers cachectic from fever, mercury, syphilis, rheumatism, to become affected with dysentery or hepatitis, was so well marked that the scheme was very properly speedily abandoned and has not since been revived.

These facts were necessarily unknown to Mr. Grant, because they are not stated in Mr. Murray's interesting Reports* on the climate of Mahabuleshwur. These reports relate to an after period and to other sanatory objects. My information has been derived from Mr. Walker's official reports, or rather I should say that such are the deductions to be drawn from these reports. Mr. Walker was at the time medical officer in charge of the station. When myself acting in that situation from 1833 to 1835, I had an opportunity of consulting the

* Transactions, Medical and Physical Society of Bombay, Nos. i. ii. v. and vii.

records of the station, and more recently within the last two years, have again enjoyed this privilege through the courtesy of the Medical Board. It is not improbable that my conclusions may be met by statements of an opposite tendency, but on this point I venture to suggest a caution. It is often forgotten that the characteristics of hill climates differ much at different seasons. The results which I have stated to have occurred at Mahabuleshwur, in the months of November, December, and January, would no doubt have been observed in much less degree in March, April, and May.

In thus venturing to differ in part from the opinions expressed by Mr. Grant, I have not overlooked his remark, that attacks of dysentery or diarrhœa were not confined to persons in broken-down health; but this is merely to say that the exciting cause was adequate to produce the disease, irrespective of peculiar pre-disposition.

I have been led further into this discussion than I at first proposed, or than its practical importance may seem to others to require. For it may be objected that when so much importance has been attached to malaria as a *predisposing* cause, the difference is rather of words than of facts. But there is surely more than this. The opinion that malaria, *in common* with many other causes, induces cachexia, and that this state gives a susceptibility to dysentery, enforces the importance, with the view of preventing the disease, of protecting ourselves from the influence of such predisposing causes. While, on the other hand, the opinion that heat-abstracting conditions of the atmosphere are the common exciting cause, enforces the importance of protecting ourselves from their influence, by attention to clothing, housing, &c., and this the more especially when we

have to deal with cachectic individuals. To state the difference in still more practical terms. The just inference from the principles which I have been advocating, is, that the cold season of all hill climates in India will excite dysentery in cachectic individuals irrespective of the presence of the conditions of malaria generation. Whereas the view that malaria is itself the exciting cause of the dysentery, will tend to condemn only those hill climates in which the conditions of malaria generation are apparent.

SECTION IV.

SYMPTOMS OF DYSENTERY.

THE division of dysentery into several varieties, the allotment of a particular name to each, and the attempt to distinguish the one from the other by symptoms, are not calculated to advance our clinical knowledge of this disease, or to strengthen our hands in its treatment. It is sufficient that, in respect to each case of dysentery, we propose to ourselves the following questions:—Is it recent or advanced? Does it engage much or little, and what parts of the mucous membrane of the large intestine? Is it idiopathic, or coexisting with remittent fever? Is it simple, or combined with hepatitis, peritonitis, or other disease? What is the state of constitution; is it sthenic or phlogistic, or likely to be the subject of erysipelatous inflammation; is it asthenic from former disease, deficient food, or elevated temperature; or is it tainted with malaria, scorbutus, struma, syphilis, mercury, or retained excretions? What is the condition of the mucous membrane,—simply reddened, or thickened, or ulcerated, or sloughing?

I must assume that the clinical student of dysentery understands how, by inquiry into the history and by observation, he is to make himself acquainted with the diathesis of his patient. I shall, therefore, in my description of the symptoms, keep in view chiefly the other practical points to which his attention has just been directed.

Symptoms.—The severity of the disease in a measure depends on the extent of surface of the mucous membrane of the large intestine, which is involved. The symptoms will also somewhat vary, according as the inflammation is rather in one part or other of the intestine. It may be chiefly in the cæcum or ascending colon, in the transverse colon, in the descending colon, or in the sigmoid flexure and the rectum. But in the severe and acute forms of the disease the greater part of the surface is generally implicated.

I shall first notice the symptoms of acute dysentery as it occurs in sthenic European troops shortly after their arrival in India. The disease frequently commences with a relaxed state of the bowels; thin feculent evacuations are passed with some degree of griping and general uneasiness of abdomen.

The fact that serious dysentery in India may begin with symptoms differing little from those of an ordinary feculent diarrhœa is practically most important. It inculcates both on patient and practitioner the lesson of carefully watching such cases, with a view to the prevention of the disease*, or the detection of its earliest symptoms. Not a few instances have come to my knowledge of serious and fatal dysentery having been permitted to develope itself from oversight of this simple rule.

* The importance of watching these symptoms of diarrhœa with reference to Cholera has been inculcated elsewhere, p. 403.

We may believe that, at this early stage, there is merely increased redness of a limited portion of the mucous surface; and that, as this extends, and passes into the more advanced stages of thickening, exudation, and sloughing, the characteristic symptoms of acute dysentery gradually evolve themselves. Thus the feculent diarrhœa may continue for two or three days; then the discharges become more scanty; but the calls to evacuate are more frequent, attended with more griping pain and some degree of tenesmus. The dejections consist sometimes merely of portions of clear mucus more or less tinged with blood; at other times there is mixed with these bloody mucous discharges more or less of feculence, generally thin, of various colours, sometimes natural in appearance, at others greenish and gelatinous-looking. Or, instead of clear blood-tinged mucus alone or intermixed with feculence, the evacuations may have a slimy oil-paint appearance of various colours, yellowish, greenish, streaked, or speckled with little patches of blood: such evacuations are in general passed without much tenesmus.

In regard to the diagnostic value of these different kinds of discharges they all indicate that the inflammatory action has not passed on to its advanced stages. When the evacuations consist of mucus clear or tinged with blood, passed unmixed, in small quantity, and with much tenesmus, it may be inferred that the secretions proceed from the inflamed mucous lining of the rectum and lower part of the colon, and are unmixed with those of the liver and small intestine; and that probably the disease is as yet chiefly confined to the lower part of the bowel.

When, however, the evacuations are more copious, partly of mucus tinged or not with blood, and inter-

mixed with more or less thin feculence, — generally passed with some degree of tenesmus, — the case differs from the first, inasmuch as the secretions from the inflamed mucous lining of the large intestine are accompanied by more or less of the natural contents of the small intestine; and all — in consequence of the presence of more extensive inflammatory action of the mucous membrane of the large intestine — are passed rapidly through and discharged. We may infer, then, that, when the evacuations are of this latter character, a greater extent of the intestinal surface has become involved; and if such discharges take place with little or no tenesmus, we may conclude that as yet the lower part of the bowel is little engaged.

But in applying these suggestions to clinical diagnosis it is necessary to caution the practitioner not to lose sight of the nature of the remedies which have been previously used. It is very evident that in the first supposed case—that in which the disease is chiefly confined to the lower part of the bowel — the action of a purgative will give to the discharges the character related to the second supposed case—that in which the disease has affected a more extensive and higher part of the intestinal surface. Again, a too free use of opium may give to the discharges of the second the character of those of the first.

In reference to the diagnostic value of the intestinal excreta, I would desire to preface one general remark, viz., that I entertain a strong suspicion that much of the dark green gelatinous, and other varieties of discharges which have been described by others, and to which much pathological importance has been attached, are the products of the excessive use of climinants, and not true symptoms of the disease.

Dysentery in Bombay and Bengal very generally commences with diarrhœa in the manner which has just been described, but sometimes it is otherwise. In the disease as observed by me in Her Majesty's 40th Regiment, at Belgaum, the bowels were often rather constipated at the commencement, than relaxed, and there was a sense of fulness and uneasiness experienced in the course of the colon, followed after a time by mucous and scanty dejections. It is when the disease originates in this manner that the intermixed feculence may occasionally exhibit a scybalous character.

The further description of the symptoms will apply equally to the disease, whether beginning with diarrhœa or in the manner last alluded to. Associated with the frequent and morbid discharges, the tormina and tenesmus, there is a sense of uneasiness experienced in some part of the course of the colon. In all cases of dysentery the abdomen should be carefully examined with the view of ascertaining in what situation this uneasiness is chiefly present. We must not expect to find the acute tenderness of idiopathic peritonitis, but rather a sense of soreness which is however very distinctly aggravated by pressure. The extent and situation of this discomfort will indicate the extent and parts of the intestine affected. The degree of the pain will suggest the complication or not of general or partial peritonitis, and our suspicion of this will receive confirmation from the co-existence of tenseness or induration* in the neighbourhood of some part of the large

* In respect to a feeling of induration in some part of the course of the colon, it is necessary to offer this caution. If the abdominal parietes be thin, we may frequently feel the intestine indurated merely from being in a state of contraction. We must be careful not to confound this with induration depending on thickening or

intestine. The clinical observer will readily appreciate the importance of symptoms of peritonitis appearing in the course of dysentery when he recollects that this serous inflammation complicates only the worst forms and the advanced stages of this disease,—those in which there is sloughy ulceration of the mucous membrane with threatened perforation of the intestine.

But in respect to the import of tenderness in the course of the colon as a symptom of dysentery, I must guard myself against being misunderstood. That degree of tenderness, tenseness, and induration related to peritonitis is a condition of an advanced and generally hopeless stage of the disease. In those early stages, however, when precise diagnosis is practically so important, a careful observer will be able to discover some *uneasy* part of the large intestine—caused by inflammation of the other tissues—to which his remedial means may be more particularly applied; but should he fail in detecting this symptom, he is not on that account to attach the less importance to the evidence of presence or severity of the inflammatory action derivable from the character and manner of the discharges alone.

Dysuria and retention of urine are occasional occurrences in the course of acute dysentery. They have been generally attributed to extension of irritation from the rectum to the neck of the bladder. Without denying that such may be the explanation of these symptoms (more particularly of mere irritability of the bladder), in occasional cases, yet the tendency of my own observa-

other organic change. The state to which I now allude is not morbid, and with careful examination and under this caution, ought not to be mistaken for disease. I have observed it most frequently in the left iliac region.

tion has been to regard them in a much more serious light. Retention of urine will very frequently be found coexisting with inflammation of the peritoneal covering of the bladder,—to be, in fact, an illustration of paralysis of the muscular fibre of a hollow organ, consequent on inflammation of its serous covering. (149. 183.)

In the account of the symptoms of dysentery given in systematic works, the straining, the frequent calls to evacuate, and the scanty mucous, blood-tinged discharges, are dwelt upon as the very characteristic phenomena of the disease. It is true that when the sigmoid flexure and rectum are the parts most chiefly affected, these are the prominent symptoms. But in Indian dysentery the chief inflammatory action is very often in parts of the large intestine above the sigmoid flexure, and then, as already explained, the discharges may be more copious, and scantiness and tenesmus be symptoms which attract little attention. All the best writers on tropical dysentery confirm this truth, and yet it often fails to correct the contrary erroneous general impression. It is because the fact that inflammation of the mucous membrane of the large intestine—dysentery—may be present without tenesmus or scanty mucous discharges, is so constantly overlooked, that cases of dysentery are very frequently returned as diarrhœa, and thus our statistical data vitiated at their very source.

In regard to general symptoms, they do not assist us much in the diagnosis of this disease. The tongue is often white at the commencement, but it exhibits no characteristic appearance; in the advanced stages it may become florid and glazed, or present other features related to the state and degree of constitutional disturbance. Symptomatic fever is generally absent at

the outset of dysentery, and is often very slight even when a considerable degree of inflammation is present. The coexistence of well-marked febrile phenomena with the early stage of dysentery should always suggest the suspicion that the disease is not simple, but a complication of remittent fever. Then the course of the affection should be very carefully watched with the view of determining this question—a most important one as respects the system of treatment.

In my remarks on the symptoms hitherto—with exception of those relating to a coexisting peritonitis—I have had in view those periods of the disease in which the inflammation has not as yet passed on to ulceration or sloughing. I have now to trace the course of dysentery to these more advanced stages and to a fatal issue.

The frequent discharges continue, but they become more watery, brown in colour, streaked with blood, or they contain small floating clots of blood, or white shreddy-looking films, or patches of sloughy tissue. Then the watery fluid becomes still more tinged red, and the fœtor peculiar and very offensive. Febrile exacerbations now become distinct—the skin may be hot and dry, and the pulse irritable, or the skin may be covered with perspiration, and the pulse small and compressible. The tongue becomes coated in the centre and dry, the abdomen not unfrequently full and tense, and before the fatal issue some degree of delirium is sometimes present.

When the dejections are serous, more or less tinged red, contain floating clots and shreds, and possess a strong dysenteric fœtor, we may infer that they have proceeded from the ulcerated and sloughy surface of the mucous coat of the large intestine: they also may

be more or less intermixed with the secretions from the mucous lining of the small intestine and the liver.

The disease, as just described, may run its fatal course in from nine to fifteen days. In those cases in which death takes place most quickly we may assume that the inflammation has been erysipelatous in character, and has led to extensive gangrene of the mucous membrane. While, on the other hand, in those in which these several stages have been passed through more slowly, we may infer that the morbid state has been thickening, exudation, gangrene, sloughing of transverse or other shaped patches of the membrane.

There are still, in relation to the severer and frequently fatal forms of dysentery, other symptoms to allude to. The discharges may contain dark-coloured blood in considerable quantity, constituting that form of the disease to which the name hæmorrhagic has been given. A reference to the cases which I have already detailed, will show that in some (170. 224. 229. 267.) a considerable quantity of blood has been found in the intestine after death, associated with a state of sloughy ulceration. But the occurrence of considerable hæmorrhage from the bowels in dysentery, is a rare event in Bombay compared with what the experience of Mr. Twining, Dr. Raleigh, Dr. Mouat, and Mr. Hare shows it to be in Bengal. In some cases it would seem to be related to the state of ulceration, to the diathesis, — scorbutic or other, — perhaps to the coexistence of hepatic disease, as cirrhosis. But in others, the hæmorrhage would appear to present itself in the early stages before the advent of ulceration, and to be a transudation related to congestion of the mucous membrane, and an altered state of the blood. These cases are, I apprehend, generally of dysentery complicating forms

of remittent fever, in which malarious influence has been great in degree.

The dangers of dysentery may further be enhanced from complication with disease of the liver. But this subject, as already observed, will be treated of, with more advantage, in connexion with *Hepatitis*.

I have traced the course of acute dysentery in its more formidable aspects, and must now follow that of the great majority of cases, to their more favourable termination.

The frequent calls to stool, the blood-tinged mucus intermixed with feculence, passed with griping and more or less tenesmus, and attended with abdominal uneasiness, may, under appropriate treatment, progressively decline, and health be restored. Under these circumstances, we may infer that the inflammation of the mucous membrane had not advanced beyond the state of redness and turgescence, and that its texture had escaped uninjured.

Instead of progressive recovery in this manner, the symptoms may continue with, perhaps, alternations of alleviation and exacerbation. The discharges, still frequent, may become gradually more copious, and consist of thin feculence, frequently of pale colour, and frothy, streaked with mucus and blood, or reddish serum, or speckled with small blood clots, films, and shreds, and be passed with some degree of griping, but very generally with little tenesmus. This change is attended with increasing emaciation, and the tongue becomes florid at the tip and edges, with sometimes a glazed appearance. The acute dysentery has passed into a chronic state. Or this chronic condition may take place without having been preceded by the symptoms of the acute degree—the diarrhœa with which I have said dysentery frequently commences, may con-

tinue, and gradually merge into this chronic form. The reader, with these facts before him, will at once understand that long-standing diarrhœa and chronic dysentery are one pathological condition ; and that, therefore, a large proportion of hospital disease, returned under the head diarrhœa, is in fact dysentery.

The question now arises, what is the pathological condition of the mucous membrane in chronic dysentery ? There may be merely a state of increased redness of the membrane ; or it may be also thickened, and have granular exudation on its free surface. There may be various states and stages of ulceration, more generally, however, of the circular form, and with cicatrization in different degrees of progress.

It is observed by an able writer*, “The second stage is said to commence when pus appears in the stools, but it must be admitted there are cases in which the disease pursues a chronic course, and terminates fatally without any such appearance.” When we consider the morbid changes that have taken place in chronic dysentery, then the probability of the presence of pus in the intestinal canal, and its ready detection by the microscope, in the evacuations, may be admitted. But that the presence of pus in the discharges of Indian chronic dysentery is frequently suggested to the naked eye of the clinical observer is altogether at variance with my experience. Indeed, I am certain that in the numerous diaries of dysenteric cases written by me in Bombay hospitals, European and native, such terms as pus, puriform, purulent, applied to the intestinal excreta, will hardly be found.

In describing the symptoms of dysentery, I have not

* Elements of Medicine. By R. Williams, M.D., vol. ii. p. 553.

thought it necessary to distinguish the disease as occurring in natives of India from that of Europeans. Cases 143 to 146. 163. 165. 167. 172, 173, 174. 181. 190. show that it occurs in the former, in forms as severe as in the latter. The general description is equally applicable to both.

SECTION V.

TREATMENT.—GENERAL PRINCIPLES AND INDICATIONS.—DETAILED REMARKS ON BLOOD-LETTING GENERAL AND LOCAL, CALOMEL, MERCURIAL INFLUENCE, IPECACUANHA, PURGATIVES, DIAPHORETICS, OPIUM, ASTRINGENTS, TONICS, FOMENTATIONS, BLISTERS, ENEMATA, DIET, AND CHANGE OF CLIMATE IN DYSENTERY.

THE treatment of dysentery must necessarily vary, according to the stage of the inflammation, and the state of the constitution of the individual affected. It is in consequence of the frequent neglect of this very simple and evident therapeutic principle, that the subject has become one of needless confusion and perplexity. Success in the treatment of dysentery will always have relation to the recency of the attack, and to the judgment displayed in adjusting the kind and degree of the remedies to the state of the constitution. The indication in the early stages is to prevent the reddened and turgescient membrane from passing into one of organic thickening, ulceration, or gangrene; and there can be no doubt that the amount of antiphlogistic means, which in some states of constitution may be required to prevent disorganization, will in others be the most certain methods of ensuring it. We are not to expect in the early periods of dysentery sudden and striking effects from our remedies, but must rest satisfied with distinct,

steady, progressive amendment; for the contrary expectation tends to lead to frequent change of the remedies, and to their being pushed to those degrees when their useful effects cease and their injurious ones begin.

When the early stage of inflammation has passed, and disorganization of tissue has actually occurred, then it must be borne in mind that restoration to health can only be effected by processes of repair. To effect these the indication is simple,—to place and to maintain the part affected, and the system generally, in the conditions most favourable for growth and nutrition. The means used for fulfilling this end are very different from those which we often find it necessary to adopt in the early stages, with the view of preventing the lesions; hence we cannot take a step towards the successful treatment of dysentery, unless we consider the period of the disease, and determine whether disorganization is to be prevented or repaired. But these two conditions do not comprise all the contingencies of practice; for there is a transition stage, in which disorganization in progress has not yet been completed, and the period of repair consequently not yet arrived. The indication of treatment in this is to be transition also,—to be gradually passing from the principles of the one to those of the other.

In my remarks on the causes of dysentery, I attached much importance to states of the constitution, as predisposing conditions. I have also shown that we cannot hope to regulate the treatment of the early stages of the disease, unless we rightly appreciate these constitutional states; and now I would advert to the importance of regarding them in the management of that period of the disease when recovery can only take place through processes of repair. With a view to the restoration of disorganized

structures generally, two leading principles command our attention:—1st. Asthenic or cachectic states of the system are to be corrected; 2nd. The parts must not be unduly disturbed. It is true that in the instance of the external surface of the body various local appliances may also be used; but these are of trivial consequence, compared with the two other indications; and in the instance of parts removed from the sphere of our senses, the precise and discriminative application of local means becomes impracticable, and then we must regard them at best as of very subsidiary, indeed, very questionable utility.

These reflections lead me to the conclusion, that dysentery cannot be treated successfully, unless we discriminate the stage, and note well the state of the constitution. In the first stage we regulate the remedies for inflammation, with reference to the constitution. In the second stage we regulate the means conducive to repair, also with reference to the constitution, and we bear in mind that the time required for effecting restoration — generally considerable — will be more or less according to the state and degree of derangement of the general system.*

* In reference to the pathology and etiology of Dysentery I have made allusion to a theoretic analogy between inflammation of the large intestine and of the skin. The question may be put in respect to treatment. Should future research demonstrate that inflammation of the intestinal mucous lining is various as regards its course and causes, as inflammation of the skin, will it not follow that principles of treatment now inculcated for dysentery will become inapplicable and require complete revision? The true answer to such a question will be found in a reference to the treatment of inflammations of the skin. What are the principles applied to these? Simply the prevention of disorganization in the early stages by sedative means; the favouring of processes of repair in the advanced stages, and, above all, the treatment of the diathesis on general principles; for it is but in very few instances that we can pretend to a knowledge of

Now let us reflect a little on the detail involved in the application of these principles, and we shall be at no loss in understanding how the treatment of dysentery has become a very confused subject, how it must always be unsatisfactory, and often injurious, unless these principles are kept steadily before us and unless we admit the further doctrine that in all chronic cases of disease time is a necessary condition of restoration to health.

What are the remedies which, if used with discrimination in the early periods of inflammation, are efficacious, but most of which, if used in the stage of repair, are injurious? Blood-letting, general and local, mercurial preparations, purgatives, ipecacuanha, opium.

What are the remedies which, if used with discrimination in the stage of repair, are more or less efficacious, but most* of which, if used in the first stage, are injurious? Astringents, tonics, alteratives, opium.

Then what are the states of constitution which demand consideration and modification in the details of treatment? The constitution may be sthenic and phlogistic,

means special to particular affections. True, local means are of subsidiary use and generally had recourse to with more or less advantage; but it is evident that whatever advances may be made in the pathology of intestinal inflammation, the safe and effective use of local remedies must always be very limited, for the simple reason that the great extent of the structure must always be hid from our sense of sight. The statement of such self-evident propositions would call for some apology to the reader, were it not that I am desirous of guarding the practice of medicine in India, on all sides, from the aimless and dreamy therapeutics, of which I have seen much and read more.

* I use this qualifying term in reference to opium and ipecacuanha, which may be used under both circumstances.

or in that state favourable to erysipelatous inflammation; it may be asthenic, or cachectic from malaria, scorbutus, vitiated atmosphere, struma, syphilis, &c. These asthenic and cachectic states — always difficult to correct — are necessarily more so when an important part of the intestinal canal is the seat of the disease. But in order to do good and to avoid injury in medical practice, we must keep distinctly before us the entire subject, with all its attendant difficulties.

Having premised these observations on the *principles* of treatment in dysentery, I proceed now to explain its *clinical details*.

The leading indications of cure may be stated as follows:—

1st. To subdue increased general and local vascular action by blood-letting, general and local. To sustain vascular action, when too depressed, by tonics and stimulants.

2nd. To favour — by preserving unembarrassed the capillary circulation of all the organs included in the portal circle — the free circulation of the blood in the mucous membrane of the large intestine, with the view of maintaining the integrity of that tissue before inflammatory action has led to organic change; or of favouring the repair of lesions which may have taken place. This is to be chiefly effected by rest*; also by, in the early stages and in robust subjects, increasing the secretions from the liver and the entire tract of the mucous lining of the small intestine, and by, in the latter stages, checking these very secretions when too profuse.

3rd. After ulceration or other organic change has taken

* The importance of the recumbent position in the treatment of this disease cannot be too strongly inculcated.

place, the indication of cure is to favour the processes of repair by attention to the state of the tissues implicated, and of the general constitution of the individual affected.

The first question then to be determined, in a given case of dysentery, is, whether the inflammatory action has terminated in disorganization, and if so, whether the disorganization has ceased to extend, and has left recovery, if practicable, to be effected only by a process of repair.

In deciding this question, we must, in a great measure, be guided by the duration and general character of the symptoms, and the diathesis of the person affected.

If the disease be of a few days' duration, and the constitution of the patient not broken by previous disease, or long residence in India; if the abdomen be full but not tense, the dejections frequent and scanty consisting of mucus more or less tinged with blood and passed with tenesmus, the tenderness of abdomen not acute, the tongue white but not much coated, and little, if any, febrile excitement present, then there is every reason for believing that ulceration has not taken place and may be prevented, and that a cure may be shortly effected by the use of appropriate antiphlogistic means. In the application of these means, however, we must keep in view the circumstance that inflammatory action, once established in a mucous tissue, never admits of being checked in the speedy manner of which it is susceptible when occurring in serous and other tissues.

If, however, the disease has existed for some time (it is impossible to be more definite because the state of the constitution influences the result), it is probable that ulceration or other organic change has taken place, and

that recovery cannot be effected unless time be given, and the patient be placed in the circumstances most favourable to reparative action. These are the cases in the treatment of which there is much room for discrimination, because there is often difficulty in determining the actual pathological condition, and consequently the indication of cure.

I shall attempt to point out a few of their distinctive features.

1st. Cases in which the abdomen is distended, tender, and tense; the dejections frequent, scanty, passed with little tenesmus, and consisting of turbid serous fluid, more or less tinged red and of offensive fœtor; the skin coldish and washy, the pulse frequent and compressible; or the skin hot and pungent, the pulse thrilling and irritable, but still compressible, with the tongue moist or dry according as the first or second state of the skin and pulse is present. In such cases, generally of from 10 to 20 days' duration, the inflammatory action will be found to have already occupied the greater extent of the mucous lining of the large intestine and to have terminated in sloughing, extensive ulceration and matting of the omentum over the colon and cœcum. Persons admitted into the European General Hospital in this stage and condition of the disease, have generally been sailors or others of dissipated habits, the residents in low taverns, either altogether neglecting the disease, or still more frequently adopting the vain and delusive course of attempting to check its symptoms by the use of ardent spirits. Cases such as these must, I fear, generally be looked upon as hopeless. But though we may regret our inability of being permanently useful, we ought to recollect our ability to do harm. The kind of treatment — antiphlogistic — which, at an

earlier stage would have been beneficial, will, under these circumstances, be positively injurious, and must expedite the fatal termination.

2nd. Under this head may be included all the variety of cases, generally classed under the head of chronic dysentery, of various periods of duration, from one or two months and upwards, in which ulceration of the mucous tunic of the large intestine, of different degrees of character and extent, exists; or no ulceration but thickening of the mucous coat with or without granular exudation, and generally existing in states of constitution more or less deteriorated. It may be that the tone of the constitution has been sufficiently preserved, so as to make the chief indication of cure the mere removal of sources of irritation and the placing thereby the tissues in circumstances in which a process of reparation will result and be perfected by the natural actions of the system. In such cases a tonic plan of treatment should be avoided, and a course mildly anti-phlogistic be pursued.

3rd. But when the ulceration or other organic change exists in deteriorated states of the constitution, from whatever cause arising, then we must chiefly regard the state of cachexia under the certainty that, if we can remove or lessen it, we shall thereby most effectually advance the restoration of the disorganized tissues. Just as in external ulcers in similar states of constitution it is vain to attempt to heal them by any other means than by those which effect an improvement in the general system.

When the cachexia, however, has been brought about chiefly by the long existence of the local disease, the patient having been, in every respect, situated in circumstances favourable for recovery, then our chances of

success by treatment are small. In a great many instances, however, other causes of general cachexia will be found to have aided the influence of the disease, for example, medical treatment may have been neglected, or it may have been too depressing, the patient may have been badly clothed, housed, or fed, or exposed to the agency of an unsuitable climate. Under such circumstances it is reasonable to expect benefit from a course of treatment judiciously tonic, and from removal of the influences which have operated injuriously.

I now proceed to notice the remedial means which have been chiefly had recourse to with the view of effecting these several indications.

Blood-letting general and local.—The degree to which it may be necessary to subdue increased vascular action, general and local, by *blood-letting* general and local, is a question which the judgment of the practitioner must determine in each particular instance. He must consider the tone of the constitution, the state of the skin and pulse, the degree of abdominal tenderness, the duration of the attack, and the consequent probable condition of the mucous coat, whether ulcerated or not, and whether complicated with peritonitic inflammation.

In Europeans of good constitution not long resident in India, not affected by the depressing influence of heat, moisture, malaria,—during the first two or three days of the attack, the pulse being of good volume and strength, and the skin without coldness and moisture, the dejections frequent, scanty, and mucous, the abdomen more or less uneasy on pressure,—there can be no doubt of the beneficial effect of general blood-letting, followed by the application of leeches according to circumstances, and by the adoption of other means

(presently to be noticed) calculated to maintain and extend the influence produced by the abstraction of blood on the congested mucous lining of the intestine. General blood-letting is seldom, if ever, expedient in the treatment of dysentery in natives of India; and whenever the attack occurs in states of constitution asthenic or cachectic, whether in Europeans or natives, the proceeding is altogether inadmissible.

In those instances of the early stages in which, from state of constitution, general blood-letting is contra-indicated, recourse must be had to the application of leeches, regulated in such manner as to meet the condition of individual constitutions. They may be applied in numbers of from two* to six dozen, and repeated more or less frequently according to circumstances. In determining the part of the abdomen† on which they may be best applied, a careful examination should be made with the view of discovering in what situation uneasiness on pressure is chiefly experienced. I have already said that asthenic and cachectic states of constitution are contra-indications to the use of general blood-letting; and when present in great degree, they are equally so of local blood-letting.

Though the benefit derived from the abstraction of

* These numbers relate to the Bombay leech, which is small; one dozen not abstracting more than about an ounce-and-a-half of blood. The size of the leech varies much in different parts of India, and must of course always be regarded by the practitioner. In respect to proportioning the local abstraction of blood to stage of disease, and state of constitution, clinical experience and observation can alone teach this.

† On the comparative efficacy of the application of leeches to the abdomen or to the anus, I am unable to offer an opinion. I have been always sufficiently satisfied with their efficacy when applied to the abdomen.

blood will doubtless bear relation to the recency of the attack, and the consequent probable absence of ulceration or other organic change, still it is not to be inferred that the utility of the measure is exclusively confined to these circumstances. Though, from the duration of the attack and the character of the dejections, there is little room for questioning the existence of ulceration, still if there be abdominal uneasiness on pressure and much tenesmus,—the state of the pulse, the skin, and general condition of the system not distinctly contra-indicating,—we may have recourse to the prudent application of leeches under the view, that though ulceration of the mucous coat exists, there is also present a degree of vascular action of the surrounding portions of the tunic incompatible with a process of healthy granulation and cicatrization, and favourable to the extension of the existing lesion.

Important though blood-letting be, in its proper place, in the treatment of dysentery, it is not to be supposed that every case of the disease in its early stage, in persons of good constitution, requires the use of this means. Instances doubtless occur in which, from the recency of the attack and the mildness of the symptoms, the disease may be readily cured by rest, the removal of lædientia, a mild laxative, an opiate, and abstinence. Such will be met with more frequently in natives of India than in Europeans; and in respect to the latter I am sure that the caution of not permitting the patient himself to be the judge of the mildness or severity of the attack cannot be too earnestly inculcated. The symptoms must be inquired into carefully, and particularly the character of the dejections observed.

There is no rule of practice in tropical disease more important than this, and none which it is of more con-

sequence to impress upon the community generally; for the mortality in India from neglected dysentery is very great; and this neglect is very frequently traceable to ignorance, on the part of the patient, of the serious nature of the disease with which he has been attacked.

The second indication of cure, viz. to favour the free circulation of blood in the mucous membrane of the large intestine, by maintaining unembarrassed the capillary circulation of all the organs included in the portal circle, is most important, and to be held in view in succession to the abstraction of blood. It is the indication which constitutes the chief object of treatment in a great majority of cases.

It may be assumed that when the capillary vessels of any portion of the vascular system directly concerned in the portal circulation are congested, and when in consequence, the blood does not pass freely through them, then a very important means, towards the removal of this state, is to disembarrass the entire portal circulation, by maintaining free the secretions emanating from the arterial capillaries of the mucous coat of the whole tract of the intestine, as well as those proceeding from the capillary terminations of the portal vein itself. In other words, to increase the secretions from the small intestine, and from the liver, is the second indication of cure in many cases.

This principle of treatment is observed in the management of many affections of the lower part of the bowel, arising from deranged circulation, as in hæmorrhoids, in fistula in ano; and it seems to me that it ought to form a main indication in the treatment of dysentery—a deranged state of the circulation of the tunics of a higher portion of the intestine.

How is this indication to be effected? Much of the

treatment generally found efficacious in dysentery is so probably on this very principle, as the use of calomel, of blue pill, ipecacuanha, and purgatives. But the action of these remedies has been otherwise explained. By some (Sydenham) they are believed to be useful, because they eliminate the morbid material from the blood; by others because they assist the discharge of vitiated and acrid intestinal contents. Which ever theory of the action of these remedies be preferred, this practical fact remains, that their efficacy has relation to the recency of the attack and the state of the constitution,—that is, the quantity of blood in the general system.

On the use of Calomel.—During the first two or three days from the commencement of dysentery, in persons whose constitutions have not been broken down by former disease or other cause, it forms an important part of the treatment,—venesection or leeching having been premised—to give, at bed-time, a ten-grain dose of calomel combined with a grain and a half or two grains of ipecacuanha, and the same quantity of opium, to be succeeded on the following morning by from four drachms to an ounce of castor oil. The guides to the necessity of repeating these measures twice or thrice are the state of the tongue—whether coated or not; the character of the dejections—whether very scanty and plainly not resulting from the liver and small intestine; and the state of the abdomen on external examination—whether rather full and resisting, or supple and soft. In the latter state of the abdomen there can, generally speaking, be little necessity for full doses of calomel.

Though the use of calomel in these doses is generally only applicable to the first few days of the attack, it occasionally happens that it may also be given with advantage in the advanced stages, in cases in which the tongue is coated, the dejections pale and scanty, the

abdomen full, and not much general emaciation, or reduction of strength present. In fact, in circumstances in which it is fair to conclude that the portal excretions are not free, and the circulation in consequence embarrassed.

The object then to be held in view in exhibiting calomel is to invite free secretion from the liver and the mucous lining of the small intestine, and to take care that in doing so the already excited state of the mucous coat of the large intestine does not become aggravated. This latter injurious effect is to be guarded against by not repeating the calomel too frequently, and by combining it, when used, with opium. This caution is the more necessary when there is good ground for believing that ulceration has taken place, because then the irritant action of the calomel is more sure to be exercised; and further because, in a state for the recovery from which time is required, there is the less necessity for attempting to influence the abnormal state of the circulation of the mucous lining of the large intestine by a rapid and considerable action on the upper part of the portal circulation.

The treatment of dysentery by large doses of calomel repeated and continued for some time, on the principle that such doses have a sedative action* on the inflamed mucous coat, does not at present, so far as I know, find much acceptance in practice in any part of India; and it may fairly be assumed that a system of treatment, at one time strongly recommended, and generally followed, as this has been, would not have fallen into disuse, unless the expectations formed of its efficacy and applicability had led to disappointment. My own belief, is that

* This question has been already considered in connexion with my remarks on the use of calomel in remittent fever, p. 219.

as a general method of treatment it is altogether inappropriate and most commonly very injurious.*

Calomel is seldom required in the treatment of dysentery in the natives of India.

Mercurial Influence.—Though not related to the indication of cure of which I now treat, yet the present is, perhaps, the most appropriate place in which to notice the treatment of dysentery by the induction of mercurial influence. The use of calomel, with this view, must be kept distinct from the cholagogue action, which has just been considered. It is hardly necessary to discuss at length the mercurial treatment of dysentery, for as a rule of practice in India, it has, I believe, been generally and certainly most properly abandoned.

As a question of theory perhaps it may be admitted that lymph deposits in the submucous tissue in sthenic individuals might be appropriately controlled by mercurial influence. Yet when we reflect, that the state of ulceration and sloughing, consecutive on thickening, is sure to be aggravated by mercury, and further that dysentery is very often associated with states of constitution for which mercury is adverse, we must acknowledge that the reasons for abstaining from the application of this therapeutic principle in dysentery are just and convincing. I can further state, from repeated observation of the fact that the system is, when under the influence of mercury, very predisposed to dysenteric attacks; this is particularly the case in the natives of India.

It is very true that the records of medicine abound

* I regret to observe in Haspel's Diseases of Algeria, a distinct leaning to treatment of disease by scruple doses of calomel, which as a routine system has proved so injurious in India, and has in consequence fallen into general and complete disuse.

with cases of dysentery cured after salivation. My earliest clinical acquaintance with this disease was in the hospital of Her Majesty's 40th Regiment at Belgaum in the year 1830. The chief means of cure were free blood-letting and mercurial induction. Many recoveries, of course, took place, and, to my inexperience, the treatment seemed efficacious. But the opportunities which have been afforded me, during the twenty-five years which have since elapsed, have enabled me to correct these erroneous early impressions, and to justify me in entertaining the adverse opinion which I now hold on the mercurial treatment of dysentery.

On the use of Ipecacuanha.—Of the various remedies recommended for the treatment of this disease, I do not know any which is to be compared in efficacy with, or which is so generally applicable as, ipecacuanha alone or combined with blue pill, or in some cases with opium, provided it be fairly tried and steadily pursued.

This remedy, brought from the Brazils by Piso *, towards the end of the 17th century, was given by him in dysentery in drachm doses in the form of infusion. It has since, at different times, been much used. Sir J. Pringle gave it sometimes in scruple doses, at other times in five grain doses, three or four times with intervals of two or three hours. Mr. Mortimer and other medical officers of the Madras army have thought highly of it in scruple doses. Still more lately Mr. Twining advocated its use in doses similar to the smaller ones used by Sir John Pringle. Haspel also combines ipecacuanha in full doses with calomel in the early stages of the disease.

The efficacy of ipecacuanha in dysentery has been

* Waring's Manual of Therapeutics, p. 298.

attributed by some to its nauseant action, by others to its diaphoretic effect, and by others, among whom is Sir J. Pringle, to its laxative or purgative effect. It is to this last property that I have considered its efficacy due. And it is with this view that I have always used it.

In the early stages of acute dysentery, after blood-letting general or local, calomel, ipecacuanha, and opium with laxatives, have been used on the principles already laid down,—the most satisfactory course to follow, is to give ipecacuanha in the doses and combinations recommended by the late Mr. Twining, viz. from six to three grains combined with blue pill from five to two grains, and extract of gentian from four to two grains, every third, fourth, sixth, or eighth hour, and to continue it steadily till amendment takes place. The proportion of the dose and the frequency of its repetition must depend on the acuteness of the symptoms. The duration of the treatment and the gradual diminution of the dose and of the frequency of its exhibition, must be contingent on the rapidity and permanency of the amendment. It must also be kept distinctly in view that, whilst the treatment by ipecacuanha is being pursued, it is often necessary—according as the state of the pulse or the uneasiness of the abdomen on pressure may indicate the necessity—to apply leeches; and also—according to the character and scantiness of the evacuations, and the greater or less fulness of the abdomen—to give castor oil, occasionally, in moderate doses.

In the dysentery of the natives of India, or in Europeans, when the disease comes under treatment at a more advanced stage or in a cachectic diathesis, it is often necessary at once to commence the treatment in the manner just described, omitting the preliminary ex-

hibition of calomel and opium, and castor oil, as recommended for the earlier stages. We must be careful not to continue the blue pill in combination sufficiently long to run any risk of inducing the constitutional effect of mercury. In determining this point we must be chiefly guided by the state of the constitution. In cachectic individuals the ipecacuanha and extract of gentian should be used without the blue pill from the commencement.

The combination of opium with ipecacuanha, blue pill, and extract of gentian, will be considered in the sequel in connexion with the use of opium.

It is not often that we are prevented from continuing the ipecacuanha in consequence of its creating nausea and vomiting. Whether this immunity from the emetic action of the drug proceeds from the effect of the extract of gentian, as supposed by Mr. Twining, or whether from a tolerance induced by the disease, analogous to that of tartar emetic in pneumonia and of opium in tetanus, it is of little practical importance to discuss. My own impression is that it depends on the latter cause, and that it will generally be found in practice, that when ipecacuanha disagrees, it is either because the disease is very mild — rather threatens than exists — or has been already removed by treatment; or because the dysentery is complicated with, and secondary to, some other serious disease, as abscess in the liver.

The principle on which the efficacy of ipecacuanha and blue pill depends, is, I suspect, very analogous, but less in degree, to that assumed in regard to calomel and purgatives. They keep up a moderately free secretion from the liver and the mucous lining of the small intestine, and thus tend to place the mucous coat of

the large intestine in the state most favourable for the return of its deranged circulation to a normal state.

Though approving the use of ipecacuanha in these doses and combinations, the practice here recommended differs in one very essential feature from that advocated by Mr. Twining. I mean the absence of the daily exhibition of a dose of compound powder of jalap. My objection to this system of treatment will be more appropriately stated under the subsequent head.

On the use of Purgatives.—To follow the exhibition of calomel and opium, as already advised at the commencement of attacks of acute dysentery, with a dose of from one ounce to six drachms of castor oil, is a very necessary part of the treatment; and during the use of ipecacuanha and blue pill, to give occasionally smaller doses of castor oil, is also very important. The chief indications, under both circumstances, are the scantiness of the dejections, and the abdomen on examination being at the same time full and puffy.

There is, however, room for the exercise of considerable discretion in the use of laxatives and purgatives in the treatment of dysentery. Given occasionally in moderate doses in suitable stages of the disease and states of constitution, they assist very materially—perhaps are absolutely necessary—in keeping up a free exercise of the secretory functions related to the upper part of the portal circulation. But when carried beyond this limit, or when given in advanced periods, or cachectic habits, they not unfrequently increase the already excited state of the mucous coat of the large intestine, and thereby aggravate the disease. I believe that this error is very frequently committed in the treatment of dysentery.

At the same time it ought not to be forgotten that

injury may be done by neglecting the use of purgatives when required, and thereby allowing the small intestine to become loaded. The following case is an illustration of this.

192. *Dysentery.* — *The Use of Purgatives too much abstained from.*—*The lower End of the Ileum distended from thin Feculence.*

John Smith, aged sixteen, admitted on the 23rd April, 1842, ill with dysentery of a few weeks' duration, tender abdomen and frequent scanty stools. Treated by moderate leeching, blister, ipecacuanha, blue pill, and gentian, and opiate enemata; no purgative. Pulse 120. For two days before death, considerable distention of abdomen. Died on the night of the 30th.

Inspection.—Matting of the omentum, ulceration and friable state of the colon. Small intestine distended with air, and the lower part of the ileum full of thin yellow feculence, and somewhat distended thereby.

On the point of practice now under consideration, I can only repeat, that by regarding the state of the abdomen as to fulness in connexion with the character of the dejections, and taking care not to confound the former with that state of tension and distention, not unfrequent in the latter stages of bad attacks, and connected more or less with peritonitic inflammation or with complication of hepatic abscess, we shall, I believe, experience little difficulty in deciding on the propriety, or not, of using purgatives in dysentery.

These remarks have chiefly had reference to the use of castor oil, for it is the purgative best suited for the disease. Still, I believe, that the course of treatment recommended by the late Mr. Twining, of a daily dose of compound powder of jalap in association with ipecacuanha, blue pill, and gentian, is applicable during the three or four first days in some forms of acute dysentery; but that the propriety of its continuance for any length

of time is, under any circumstances, very doubtful, and under some clearly injurious, as when the tenesmus is very urgent or the secretions not much repressed.

Of the necessity of this caution in respect to the use of purgatives in dysentery as occurring in Bombay, there can be no doubt, and from later writers it may be gathered that they are equally applicable to Bengal. Still it is at the same time useful to remark that the treatment by purgatives, in the manner advocated by Mr. Twining, has seemed to me much more useful in dysentery in European troops in the monsoon season in the Deccan, than it has been found to be in Bombay. I have also in former times used the same treatment with advantage in well-conditioned native troops in the cold season in the Deccan ; and more recently at Gharra in Scinde, in February, 1844. The latter instance was the more instructive, because the same kind of treatment in the same body of men had been inapplicable to the disease as occurring at Hyderabad in the previous month.

It is important to keep these facts in view, because in all probability difference of season and of climate may call for modifications in the treatment of dysentery, as in that of other diseases. It is not improbable that purgatives ought to be given more freely in the treatment of dysentery in drier and colder, than in moister and warmer, climates. The state and amount of the excretions, and the character of the constitution, will always be sufficient to determine this point of practice in individual cases.

It should, moreover, be always borne in mind that the beneficial use of laxatives is chiefly confined to the outset of the disease, and nothing can be more faulty in practice than the method which obtains in many hospitals of giving to every patient admitted with dysentery

a dose of castor oil as a matter of course, whatever may be the state of the patient, or the stage of the disease. This routine system is often followed by injury, and is altogether at variance with rational therapeutics.

Diaphoretics.—The maintenance of a sufficient temperature of the surface of the body, and the avoidance of all risk of its depression, must be carefully attended to in the treatment of dysentery. But general diaphoresis, either caused by internal remedies, or external appliances, as the warm bath, does not, in my opinion, constitute any part of the treatment of dysentery in India. Even were a perspiring state of the skin a positive benefit in this disease, of which I am not convinced, still it would seem to me that the practical disadvantage would more than counteract the gain; for the tendency of free perspiration is to interfere with effective ventilation of the sick room, and to increase the chance of exposure to chills, consequent on frequent disturbance from the disease.

On the use of Opium.—The opinion, which has been generally and for long entertained, of the efficacy of opium in the treatment of dysentery, is quite in accordance with the result of my experience. In certain combinations and doses, opium is applicable to, and useful in, almost every condition of the disease. It may be advantageously combined with calomel at the commencement, with ipecacuanha, blue pill, and extract of gentian in the more advanced stages, and may be given alone or in union with tonics and astringents after the disease has existed for some time, and is only to be recovered from by a process of repair.

The doubts in regard to the efficacy of opium in this disease, which were partially entertained by Sir J. Pringle, and more distinctly avowed by Twining and

Haspel, weigh little with me, for they refer to an unskilful use of the remedy, and may be readily obviated by attention to combination and to other points of treatment, as Sydenham well knew and explained.

The mode of action of the remedy is probably the same under all the circumstances of the disease in which it is useful. It controls the increased peristaltic action consequent upon the inflammation of the mucous membrane, and allays the distressing sensations caused by it and by the other effects of the inflammation. But it may be objected that opium given in free doses and frequently repeated represses the secretions generally; and that thus its use in dysentery is opposed to what, throughout my remarks, has been insisted on as an important indication of cure in the early and middle stages of the disease—the keeping up a moderately free secretion from the mucous lining of the small intestine and from the liver. To the practice of giving opium alone in these stages this objection is just; but it is obviated by, in the early stages, combining it with calomel, and, in the more advanced ones, with ipecacuanha and blue pill. Thus, by these combinations we effect two objects important to the cure, but to one of which each remedy, taken singly, is opposed. We allay the irritation of the large intestine by opium, whilst we invite the secretions from the upper part of the intestinal canal, and its associated secreting viscera, by calomel in the one case, and by ipecacuanha and blue pill in the other; and we lean to one indication or the other by varying the proportions of the combination according to the circumstances of particular cases. The necessity of thus varying the proportion of the different ingredients is often exemplified in the combination of ipecacuanha and blue pill with opium. If, in the treatment with ipeca-

cuanha and blue pill repeated every four hours, the secretions are free, the dejections frequent, the tenesmus distressing, and the abdomen soft and supple, we shall often find that, by the addition of a grain, or a grain and a half of opium to each dose, the symptoms will improve. But, after a time, the adverse action of the opium may begin to appear, the secretions may become scanty, the abdomen rather full, and the tongue perhaps foul. Under these circumstances it will generally be found better practice to omit the opium and to continue the ipecacuanha and blue pill, trusting to them to re-excite the secretions, than to give a purgative, and then resume the treatment with opium. For the better illustration of the manner in which it has seemed to me useful to exhibit opium in these stages, I have described extreme cases; but between these there are many degrees which must be met by corresponding modifications in the treatment, such as by lessening the quantity of opium rather than by omitting it altogether.

The object aimed at by this system of treatment is very similar to that which Sydenham and other physicians have had in view in alternating the exhibition of purgatives and opiates. But it possesses this advantage, that we avoid the risk of excessive action, which is always liable to follow the use of a purgative in the more advanced stages of dysentery.

But when opium is given alone, or in combination with tonics or astringents, in cases of chronic dysentery, with the view of favouring the reparation of ulcers, and—in states in which it is an indication of cure—of repressing the already too abundant secretions, then its efficacy is still more apparent, because both its sedative and astringent actions assist in fulfilling the indications of cure.

Under these circumstances opium may often be given in two or three-grain doses every third, fourth, or sixth hour with very great advantage, if not in effecting the recovery of the patient, certainly in lessening much his sufferings, and consequently placing him in the condition most conducive to his cure. One of the most unexpected recoveries which I have witnessed was under the use of full opiates.

193. *Good Effects of Opium, in the Treatment of some States of Dysentery, illustrated.*

George Pemball, aged nineteen, of strumous habit, and slight frame, after eight days' illness with dysentery, was admitted into the General Hospital, on the 30th June, 1840. He was leeches two or three times, and blistered. Ipecacuanha, blue pill, and gentian, and anodyne enemata were used. He improved for a few days, then fell off. About the 15th July he was in a very precarious state. There was much emaciation, the pulse was frequent and small, the tongue was florid, sometimes dry, and sometimes coated. The dejections were frequent and scanty, consisted of mucus and blood, were sometimes yeasty and offensive, and were passed with much tenesmus. From this time the treatment consisted of large opiates, combined with quinine, blue pill, or trisnitrate of bismuth. On the 28th July he began to take three grains of opium, with one each of quinine and blue pill, every third hour. The amendment was now tolerably steady and progressive, and the quantity and frequency of the opiate was gradually reduced. On the 30th there was slight relapse, when four grains of bismuth and one and a half of opium was used every fourth hour with excellent effect. On the 22nd August all medicine was omitted, and he left the hospital on the 24th in tolerable flesh, and with regular bowels. From the 15th he had chicken for dinner.

My remarks on the use of opium have had reference to its exhibition in the form of pill, but I by no means undervalue its utility in the form of enema, in the manner usually employed. We have hitherto been engaged in considering the two first indications of cure (p. 548.). The third remains to be noticed.

3. The third indication of cure has reference to the repair of ulcers when existing in the mucous coat. This, after increased vascular action of the mucous lining has been subdued, must be effected by tonic treatment in its most extensive acceptation—medicinal, dietetic, climatic—and by restraining the secretions from the small intestine, when excessive, which they are apt to be in old cases in reduced subjects.

On the use of Astringents and Tonics.—I have already shown, that in the advanced stages of dysentery, when it may be presumed that the mucous coat of the large intestine is in a state of ulceration, and that recovery is only to be brought about by a process of repair, and when this condition is present with free discharges from the bowels and a deteriorated state of the constitution, then the efficacy of opium is very apparent. Under the same circumstances, the use of various astringent and tonic remedies is often very beneficial. Of these the most generally had recourse to, are the acetate of lead, trisnitrate of bismuth, sulphate of quinine, sulphate of copper, preparations of iron, nitrate of silver, preparations of catechu, kino, hæmatoxylon, pomegranate bark, Bael fruit, and gallic and tannic acids.

The metallic salts are, in general, used in combination with opium in various doses, and it is not to be questioned, that much of the benefit which results is dependent on the opium with which these tonics and astringents have been combined. These classes of remedies, however, have hitherto been given with little discrimination, and there is yet room for careful research, with the view of determining the circumstances of the disease under which they should be respectively applied. From neglect of this care there has been a

fluctuation in medical opinion, in regard to the therapeutic value of these means, which is not creditable to medical science, and which careful clinical inquiry is competent to remove.

All that I can attempt on this subject is to offer a few suggestions in respect to principles, and then to state the result of my own experience.

Astringents are indicated only in chronic dysentery, and in the hæmorrhagic form of the acute disease. In chronic dysentery, ulcers or other lesions require to be repaired. For this a certain degree of tone of constitution is favourable. Increased intestinal discharges are adverse to this state of constitution; hence we endeavour to restrain them by astringents. Such seems to me the simplest and truest explanation of the action of this class of remedies in chronic dysentery; and should the astringent principle be in combination with a tonic principle, then we may conceive the efficacy of the remedy to be enhanced.

A state of constitution favourable to processes of repair can only be brought about and maintained by suitable arrangements of the vital stimuli, food, air, &c.; and it is to remedies, which favourably influence the action of these stimuli, that we give the name of Tonics. But they are very subsidiary to the vital stimuli themselves, and we must always be watchful in particular cases that they do not operate adversely instead of favourably. This caution is especially necessary, in respect to all diseases of the alimentary canal. Hence, in the treatment of chronic dysentery, there is risk of injury in unskilful hands from the use of astringents and tonics.

The cachectic states associated with chronic dysentery are various. The special means at our command for

the correction of special cachexiæ are limited, yet they should be carefully kept in view, for their increase is probable. It is in this direction that we shall, in all likelihood, find the resources of our art most susceptible of improvement in the treatment of chronic dysentery. For example, when dysentery is related to a malarious cachexia, we may expect the greatest benefit from astringent and tonic preparations of iron, from quinine, and from a combination of vegetable bitter and astringent principles. When there is reason to think that the cachexia is scorbutic in character, then we direct our attention to vegetable acids, and to astringent, tonic, and mucilaginous principles in combination with these. It is in these circumstances, probably, that the *Bael fruit*, lately again so favourably reported of in Bengal, by Mr. Grant and others*, is chiefly useful.

I cannot speak of the value of this remedy from personal experience, as my trials have been few, yet I may venture to entertain the apprehension that unless the states of the disease for which it is appropriate be determined with precision, the good which I doubt not the Bael is capable of effecting in suitable cases will be lost to medical practice. I do not for a moment suppose that professional men expect to find in the Bael fruit, or any other article of the *Materia Medica*, an universal remedy for dysentery; but I have had opportunities of learning something of the state of popular credulity in the instance of the Bael fruit, and of noting its tendency to exercise an injurious influence on rational treatment.

There is still another suggestion to be made in regard to the efficacy of such remedies, as pomegranate bark, Bael fruit, and others whose positive therapeutic

* Indian Annals of Medical Science, No. iii.

properties cannot be very great. There is reason to believe that sometimes the good is negative and not positive. The fact may be lost sight of that these remedies are usually had recourse to after many others have been previously used, and not unfrequently injuriously continued; and that, therefore, the benefit from the change may proceed from the removal of lœdientia, not the application of juvantia.

That this is not a fanciful suggestion I know from experience. I have observed in the treatment of dysentery, in children, that if opiates be unduly continued, the discharges are apt to become pasty and scanty, and the general state of the child to deteriorate. If then the opiates be omitted, and a weak decoction of pomegranate bark be substituted, speedy improvement may be anticipated. But in these facts, which I have witnessed, I do not recognize the therapeutic virtue of the pomegranate, but merely a want of skill in the previous use of the opiates. It is well observed by Cullen somewhere in his writings, that the physician shows as much skill in determining when to leave off a remedy as when to use it. There can be no doubt that a want of appreciation of the injurious effects of previous remedies is a great source of fallacy, in respect to the appreciation of the true effects of subsequent ones; and to no disease does this observation apply more truly than to dysentery.

In regard to the opinion which I have formed of the respective value of some of the remedies which have been named I would remark, that my trials of the *acetate of lead*, in tropical dysentery, have not been numerous, because those which I have from time to time made, have failed to inspire me with confidence. If it be an indication in the treatment of chronic dysentery

to improve the general state of the constitution, it is very evident that no effect of this kind can be looked for from a continued use of a salt of lead, and that under this view, its prolonged exhibition must be inexpedient. Acetate of lead has, moreover, I am certain, been injurious in the treatment of acute dysentery, for which, with a sad want of discrimination, it has been occasionally given.

The *trisnitrate of bismuth*, and *quinine*, I have used more freely, and often with advantage. But the *sulphate of copper* is the remedy of this class which is followed by the most immediate and striking good effects. It has been given by me in doses of from a grain to two and a half grains, with an equal quantity of opium, every sixth, fourth, or third hour, according to the urgency of the symptoms. The cases for which it has seemed to me most applicable, are those in which the dejections are very frequent, copious, often frothy, showing that the secretions from the small intestine are in excess and are not retained, for any time, in the large intestine. In the advanced stage of acute attacks with sanious blood-stained discharges—the evident secretions from an extensive, irritable, probably sloughy ulcerated surface—it is very proper to try either the acetate of lead or sulphate of copper, or any other astringent which may hold out the prospect of benefit;—but with a knowledge of the existing pathological conditions, it is vain to expect much success from their use.

Nitrate of silver, in doses from one to three grains, combined with opium, has from time to time been tried by me, both in Europeans and natives, but I have formed no high estimate of its efficacy.

In respect both to the salts of copper, and of silver, it may be said that we cannot point to any particular

cachectic state for the correction of which they are appropriate; and that, therefore, their use must at present be empirical, and attended with the occasional risk of harm.

Of the *preparations of iron*, the solution of the perses-quinitrate has been the most efficacious in my hands. With the sulphate of iron combined with opium I have been disappointed.

The *vegetable astringents* have not been much used by me; but from my trials of the gallic and tannic acids, I infer that they will be found worthy of good place among the remedies for chronic dysentery.

It is very doubtful whether any of these astringent remedies can be used with much prospect of advantage, unless the tongue be moist and tolerably clean; and though in cases in which the tongue is florid, chapped, and dryish, it may be proper cautiously to use them,—because no other course is open to us,—still it should be done with much watching and under no very sanguine expectation of benefit resulting.

In chronic dysentery the dejections are often very pale, sometimes almost of chalky appearance, but under such circumstances this appearance is no indication of the expediency of having recourse to mercury; and no contra-indication to the use of astringents, for it will not unfrequently be found that as the dejections decrease in frequency under their use, the colour of the excretions gradually assumes a more healthy aspect.

Should, under the use of astringent remedies, the bowels show a tendency to become confined, it will be found better to intermit their use and thus avoid the exhibition of a laxative or purgative, which, under these circumstances, will not unfrequently be found to aggravate the disease.

The astringents used with the view of restraining hæmorrhage in the hæmorrhagic form of dysentery, are chiefly the acetate of lead and the vegetable astringents. The most striking effects of this kind which I have witnessed, were in the practice of Dr. Leith, from gallic acid and tincture of catechu — eight grains of the former and two drachms of the latter were given every hour and a-half alternately, and port wine was at the same time freely used. The case was one of hæmorrhagic dysentery, with adynamic phenomena, in a European officer, and restoration was complete.

On the use of Fomentations and Blisters.—Fomentations to the abdomen, carefully, frequently, and assiduously used, are often very useful in the early stages of acute dysentery, and aid materially the more important measures.

The wet compress of the hydropathic system has been of late years a favourite application with some; and if it be a convenient mode of applying heat and moisture to the surface of the abdomen, it may possess practical advantages of which I am unable to speak from personal experience.

In the treatment of chronic dysentery the maintenance of an equable and suitable temperature of the surface of the abdomen by appropriate clothing, bandages, &c., is an important indication.

Blisters. — When signs of inflammatory action continue after the local detraction of blood has been carried to the extent which may be considered prudent, the application of a large blister to the abdomen is not unfrequently had recourse to. My own impression is that blisters under these circumstances do little good in dysentery, and, as they occasion considerable discomfort, I am on the whole averse to their use.

But when inflammatory action is chiefly confined to particular parts of the intestine, as the cæcum or sigmoid flexure, indicated by tenderness or perceptible induration, and when, from the stage of the disease, it is probable that ulceration exists, associated with that inflammatory condition of the surrounding tissue — favourable to disorganization, and adverse to repair — then the application of a small blister, from two to three inches square, is often very useful in succession to adequate leeching. Under these circumstances the derivative advantages of the blister are obtained without the risk of constitutional disturbance.

The liquor lyttæ has seemed to me the most convenient epispastic preparation.

On the use of Enemata. — When tenesmus is urgent, and pain at the lower part of the rectum distressing, the local application of opium by enema, or suppository, often affords great relief. Opiate enemata, with addition of acetate of lead, have also been used by me, but not, apparently, with any greater advantage than that due to the presence of the opium.

To these uses, and to the occasional exhibition of cold water enemata, my experience of this class of remedies is restricted.

The free use of large enemata in the treatment of dysentery, acute and chronic, has been lately urged upon the attention of the profession by Mr. Hare*, of the Bengal Medical Service. In acute dysentery a flexible tube is passed above the sigmoid flexure, and warm water, without limit in quantity, is then slowly injected by a powerful pump, till the patient complains of the distention, and the abdomen becomes visibly enlarged.

* Indian Annals of Medical Science, No. ii. p. 485. and 495.

In chronic dysentery large enema (six or seven pints) are used daily, with the view of removing acrid secretions, softly stretching the strictured parts, and applying emollient, astringent, or stimulant lotions to the diseased surface of the intestine.

Though unable to offer an opinion on this system of practice from my own experience, still it is incumbent on me to state the convictions left on my mind from a consideration of the subject. The merits of this mode of treatment must, if deemed necessary, be practically determined by other inquirers, for the arguments with which it is urged carry so little weight with me, that I am unlikely ever to make it the subject of experiment.

In respect to the use of large warm water enemata in acute dysentery, I would observe:—1st. That, should a case of dysentery present itself in which there is good reason for believing that the large intestine is loaded with scybalous or other feculence, the advantage of removing these contents by a sufficient enema of warm water may not be called in question. But a case of dysentery answering to this description I have never seen, and, if a possible occurrence, it must be certainly so rare as not to call for notice in laying down a method of treatment of this disease. 2nd. That many cases of dysentery may recover well under rest, abstinence, and large warm water enemata, is not to be doubted; but such cases will recover equally well under rest, abstinence, three or four drachms of castor oil and an opiate, or even without these latter means. Therefore in such the enemata are unnecessary. 3rd. That the treatment of the severer forms of dysentery, in which thickening soon takes place or the inflammation is crysipelatous,—passing on to gangrene and sloughing, and secondary peritonitis,—can be much advanced by the application of

fomentations to the affected mucous surface, is to invest this remedy in respect to the intestinal tissues with a therapeutic value which it certainly does not possess when used in the same degrees and kinds of inflammation in other textures of the body. 4th. That dysentery is caused or kept up mainly by the acrid nature of the secretions is a pathological doctrine from which I altogether dissent. Surely it is not when the secretions from the small intestine, are passing copiously into the large intestine, through it, and being discharged, that the symptoms of the disease are most distressing. Is it not rather when the discharges are scanty and consist of little else than the mucous, bloody, or serous exudations proceeding from the inflamed membrane itself that we are chiefly called upon to palliate pain? and though it may be admitted, that under these circumstances the application of warm water to the intestinal surface may have a soothing effect, yet it cannot on this account be advanced to any other than a very subsidiary and occasional place in the treatment of this serious disease. 5th. Under any circumstances of dysentery, to distend the intestine,—thus alter the relation of the mucous to the other coats, and do away with the advantage of rest,—is I apprehend, a proceeding of very doubtful expediency. But when we recollect what pathology teaches us, that there comes on a stage, often quickly, and not marked by characteristic symptoms, in which the coats of the intestine become friable, and sloughy apertures are patched up by tender lymph adhesions, I would ask, what is likely to be the effect on such an intestine of water injected into it without limit by a powerful pump, till the patient complains of distention and the abdomen becomes visibly enlarged?

In respect to the use of large enemata in chronic dysentery:—1st. All that has been said in relation to the

acute form on the removal of acrid secretions and distention of the gut applies to the chronic form also. 2nd. In the treatment of cutaneous ulcers, or those of visible mucous membranes, local applications are undoubtedly useful; yet they are subsidiary to general and constitutional treatment, and to the rest, position, and support, by which the local circulation of the part is favoured. Moreover, the degree of utility accorded to topical remedies is contingent on the ulceration being visible,—that is, on our ability to vary the applications according to circumstances, and to apply them with precision. Keeping these facts in view, and recollecting that ulcers of the large intestine are out of sight, I would ask whether the repeated use of large injections of solutions of sulphate of copper, alum, nitrate of silver, &c., are not as likely to be injurious as beneficial? It may not, I admit, be justifiable on these grounds, to dissuade altogether from the use of these means in chronic dysentery because in the weakness of our art we must act at times on probabilities; but I can have no hesitation in recording my opinion that they must at best be very subsidiary means, always require to be used with caution and discrimination, and under a full appreciation of the leading importance of constitutional treatment and rest of the affected organ in the management of chronic dysentery.

In conclusion, however, I would observe, that nothing is further from my desire than to check inquiry on this or any other point of medical practice, or to undervalue the zeal* and ability with which this has been

* In medical writing I am most anxious to avoid the semblance of a controversial spirit, from the tendency which it has to obstruct inquiry and true progress, yet I cannot avoid noticing the subjoined passage with which Mr. Hare concludes his paper. To use

advocated. The reasons which have influenced my own actions have been stated, but to others they may appear insufficient.

On Diet.—The same principles which direct the medical treatment of dysentery must guide us in determining the diet which is appropriate in particular cases and different stages.

So long as the indication of cure is, by antiphlogistic remedies, to prevent disorganization of the mucous coat, or to check its extension, the diet, as a matter of

the vague statistical data of Indian or other hospitals for the determination of questions in therapeutics, is an error that has exercised, and does still exercise, an injurious influence on the practice of medicine. The statistics of disease adequate for this important end do not as yet exist in India or in any other country except on a most limited scale, and they will require to be of a nature very different from that of ordinary hospital records.

To base on data altogether insufficient for the purpose, an argument for returning to the treatment of dysentery by salivation, is, I think, very much to be deplored. It is advocating on unsound reasoning an injurious system of practice. Mr. Hare thus writes:—

“ I must remark, in conclusion, on malarious dysentery, that if the above treatment by injections be not adopted, statistical facts of the most undoubted kind prove the necessity of our returning without delay to the salivating system. For the returns of the largest and longest established Dysenteric hospital in the world, show, that since mercury has been avoided, the mortality has been double, for many years’ continuance, what it was when salivation was sought for, as the first and only object of treatment; and to complete the remarkable proof of the importance of mercury (if my system by quinine and injections be not received), these statistics clearly show, that as mercury has gradually been disused, so the mortality has correspondingly increased. If statistics then, are, as they ought to be, our only guide to rational practice, our path is clear,—we must return to salivation till some more successful method be discovered. But the fact that in treating 346 cases in Calcutta, I had but $4\frac{3}{4}$ per cent. deaths, will, I hope, induce a trial of large injections by others, and thus prevent the necessity of resorting to the more injurious remedy — mercury.”

course, must be extremely restricted. When, on the other hand, the indication of cure is to effect recovery by the reparation of lesions which have taken place, we must recollect that, to enable the debilitated or deteriorated system thus to act, nutriment is essential. It must be supplied of that kind and in that quantity which the digestive organs, in part impaired by disease, are capable of assimilating. I need hardly observe that oversight or neglect of this must be a fatal error, and that, unless it be carefully attended to, medical treatment must be utterly futile.

In arranging the diet for acute cases, and while antiphlogistic remedies are indicated by the stage of the disease and the state of the constitution, there need be no difficulty. Thin farinaceous solutions in small quantity from time to time is the only food that is necessary or safe: and as recovery advances, the change to more nutritive food must be cautiously made.

But when the constitution is asthenic or cachectic, or recovery to be effected only by processes of repair, then the adjustment of the diet will require all the judgment and discretion of the physician; and, in regulating it, he must be guided by his knowledge of the principles of physiology and pathology, and of the habits of the people amongst whom he practises.

The articles of food from which selection may be made are farinaceous solutions and jellies, milk, animal broths and jellies, solid farinacea and animal food. When a scorbutic cachexia is suspected*, then to meet this some modification of diet will be necessary. It is in such states, in all probability, that ripe grapes

* I use the term "suspect" because there can be no question that the scorbutic diathesis exists long before its presence is made certain by spongy gums and subcutaneous extravasations.

have been given at the Cape of Good Hope and elsewhere with advantage. In respect to the use of wine we must be also regulated by general principles. It will no doubt be sometimes useful; but, on the whole, I suspect that the error is more frequently on the side of giving it when it would have been better to abstain.

We must avoid the affectation and empiricism of attaching an undue importance to particular articles of food as of universal application, and must keep always before us the golden rule,—when the indication is to build up degenerate structures by processes of nutrition,—not to go beyond the powers of digestion and assimilation of the weakened system; and further we must recollect that, in the instance before us, it is an organ important to digestion itself that is structurally impaired.

On Change of Air and of Climate.—In considering the causes of dysentery, importance was attached to conditions of the atmosphere either as predisposing or exciting causes.

If an atmosphere, loaded with moisture, or vitiated by malaria or emanations from decomposing vegetable and animal matter or excess of carbonic acid, favours the onset of the disease, then removal from these influences must be an object to be kept in view in its treatment.

The physician, in acting on this principle, will sometimes have to exercise much judgment and discretion, in balancing the advantages of rest and medical care and the disadvantages of these atmospheric influences, against the evils of the excitement of motion and less careful treatment. But, on the whole, this difficulty will not often arise; for the benefit from rest and careful medical treatment and management in acute dysentery, is so unquestionable, that the evidence of unsuitable lo-

cality will seldom be sufficient to counterbalance it. I need hardly observe that I speak now of such change of air as shall involve a journey and the interruption of medical treatment,—not a change merely from one house or room to another; for in this, as in all other diseases, the removal of the sick from confined houses and ground-floor apartments to those that are well ventilated and elevated, is an advantage which should be secured whenever practicable.

It may be laid down, then, as a rule subject to very few exceptions, that in the management of acute dysentery rest and watchful medical treatment are to be enjoined, and the excitement of travelling and the interruption of medical care strongly dissuaded from.

But now the question arises. To what extent are we to look for benefit from change of climate in chronic dysentery? If the climate, in which the affected with chronic dysentery resides, is adverse to processes of repair—is not tonic in its general influence; but from malaria, moisture, or continued elevation of temperature, exercises a depressant influence on the vital actions, then removal from such climate is a leading indication of cure.

In selecting a climate suitable for such cases, we must be careful, while we aim at securing a temperate and pure atmosphere, to avoid considerable and sudden reductions of temperature; whether this effect on the system be caused by absolute lowness of temperature from winds, or varying states of atmospheric moisture. Change to Hill Sanatoria in India, more particularly in the cold season of the year, is, on these accounts, generally unsuitable in this disease. In change to other countries the season of the year and the character of the climate, in respect to these atmospheric condi-

tions, must be carefully kept in view; and if they cannot be altogether avoided, the risk of injury must, as far as practicable, be obviated by attention to clothing and avoidance of exposure.

The means by which the change of climate is to be effected, is also of great importance, for exposure to the excitement of motion, unsuitable food, confined and vitiated air, in the passage from one country to another, are injurious influences, often overlooked, but which the physician must keep before him in recommending change of climate. For example, the efficacy in chronic dysentery of a sea voyage in temperate latitudes, in a comfortable airy ship, is undoubted. From the diminished alvine and urinary excretion, observed in persons at sea, we may infer that there is a corresponding increase of pulmonary and cutaneous elimination, and that the benefit derivable from a sea voyage, in affections of the bowels, is perhaps in part to be explained by this altered relation of the eliminatory processes, and the fuller influence of oxygen which is involved in it. But this advantage of sea-air is in a great measure neutralized in the overland journey from India as now conducted. The invalid has to contend against the adverse influences of the discomfort of the coaling stations, the fatigue and excitement of the journey through Egypt, the unsuitable dietaries, and the over-crowded and badly ventilated cabins. These are all serious evils*, and are sure

* I venture on this statement from having been a passenger in 1853, in three of the vessels of the Peninsular and Oriental Company, on the Suez and Calcutta line, and in two between Bombay and Ceylon. By "unsuitable dietaries," I do not mean the table arrangements for the healthy, for in general these were good. Also in 1854 from Bombay to Suez, in one of the Hon. East India Company's vessels: in this the adverse influences complained of were still more apparent.

to operate injuriously on those who journey from India by this route, in any but a state of advanced convalescence.

SECTION VI.

DYSENTERY IN CHILDREN IN INDIA.

My opportunities of studying the morbid anatomy of dysentery in young children have been very limited, and I am unable to say to what extent the sloughy disorganization, common in the adult, occurs in the early periods of life.

The general description of the symptoms, and the principles laid down in respect to the causes and the treatment, apply equally to all ages.

In regard to the treatment, it may be further observed, that in the child we must be very cautious in the abstraction of blood, and the necessity for this is best obviated by early and careful watching, and such judicious use of the other means at our command as shall prevent the disease passing to that degree of severity which may demand the application of leeches.

The caution given in respect to the adult in the use of calomel is also applicable to the child. It can only be necessary in sthenic children, and then merely at the commencement of the attack, in small doses, combined with ipecacuanha, and not repeated above two or three times. Fomentations will be found very useful in the acute dysentery of the child. The indication for the use of castor oil, in small doses, and the cautions against its abuse, are the same as those laid down in respect to the adult; with perhaps this modification, that on the

whole, freer alvine excretions are required during the season of growth than of maturity, and that this probability should not be lost sight of in the use of laxatives in this disease. Ipecacuanha, given in the manner already recommended, is fully as valuable a remedy in the treatment of dysentery in the child as in the adult, and is quite as applicable.

The combination of ipecacuanha, blue pill, and extract of gentian may be given, rubbed up with a little aromatic water; or the extract of gentian may be dried, and chalk and mercury substituted for the blue pill, and this combination be prescribed in the form of powder. If opium be indicated, a suitable proportion of Dover's powder may be added. For a child between two and three years of age, two grains of ipecacuanha will probably be a suitable dose in the acute disease. It may be increased or lessened according to the constitution of the child, the acuteness of the symptoms, and the tolerance of the remedy. The following case illustrates well the efficacy of ipecacuanha in the treatment of dysentery in childhood.

194. *Acute Dysentery in a Child. — Treated with Ipecacuanha and Blue Pill.*

Charles Bowen, a European child, of three years of age, after suffering from dysenteric symptoms for fifteen days, was received into hospital on the 9th December, 1851. The calls to stool were very frequent; the evacuations were scanty, consisted of blood-tinged mucus, and were passed with straining and prolapsus. The skin was dry, and above the natural temperature; the tongue was white; there was no fulness of abdomen, and he did not acknowledge abdominal tenderness. Two grains of ipecacuanha, three of extract of gentian, Dover's powder, and blue pill, each one grain, were given every third hour. The hip-bath and fomentations were used, and the diet consisted chiefly of sago. The improvement was rapid: the stools became less frequent, more copious, feculent; passed with less straining and

no prolapsus. The Dover's powder was omitted and the medicine was continued at longer intervals. He was discharged quite well on the 15th.

Opium in the form of Dover's powder, or the compound chalk powder with opium, is also much used in the treatment of dysentery in children, and the principles laid down in respect to its use in the adult should be observed, with, however, this additional caution. The astringing influence of opium on the excretions in the adult, is more likely to be adverse in sthenic states of the system when the processes of excretion are most necessary, and require to be greater in degree. The same is true of the child during the season of growth; but, in fact, the continuous use of opiates is a more common practice in the treatment of the disease in the child than in the adult; whereas, if these views be correct, it ought to be less so, and to be conducted with more caution. I do not suggest the caution to meet the theory, but because, as previously observed, the adverse influence of the opium, too-long continued in children, has forced itself upon my notice in practice. (p. 572.)

When the disease becomes chronic in children, we must then look chiefly to the vegetable astringents and the preparations of iron for remedies. I have no experience of any of the other metallic astringents or tonics in childhood, and am not disposed to anticipate any good, but rather to apprehend harm from their use.

The tendency of my remarks on the chronic form of the disease in the adult, was to show that more good was to be anticipated from judicious adjustment of food and of climate, and attention to the state of the skin, than from particular medicines. This, I believe, is still more true of the child; and it is particularly

necessary, at this early period of life, to be very guarded in not carrying our remedies beyond that point when they cease to be useful and begin to prove injurious.

SECTION VII.

DIARRHŒA.

THE term Diarrhœa occupies a prominent part in the returns of disease in tropical climates, therefore, it may not be passed over without special allusion. The transient increased feculent, or more or less vitiated discharges, which take place consequent on excesses or exposure in all countries, and to which the name Diarrhœa has been given, occur also in India. But the evil in India is, that these comparatively unimportant affections are frequently confounded with symptoms allied in character, which occur premonitory of cholera attacks or at the commencement and in the advanced stages of dysentery, and to which the name Diarrhœa is also often given in hospital returns.

To mistake these latter alvine discharges of grave import for the former transient and unimportant ones, is a very serious error in practice, and one that is frequently committed. To class all these affections under one name, is to render our returns on this point valueless in etiological, pathological, and therapeutic questions. I refer to p. 403. 534. for details on these subjects.

TABLE XXIV.—*Tabular Statement of the Admissions and Deaths from Dysentery in the European General Hospital at Bombay, for the Five Years from July 1838 to June 1843; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1838.		1839.		1840.		1841.		1842.		1843.		Total.		Monthly Average of the Five Years.			
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per Cent. on Admission.	Admis. per Ct. on Total.	Deaths per Ct. of Total Hospital.	
January	-	-	12	2	1	4	19	4	13	2	22	5	78	17	21.8	14.2	39.5	
February	-	-	2	1	5	1	3	2	8	4	11	4	29	12	41.8	7.	37.5	
March	-	-	8	1	8	2	2	1	13	-	12	1	34	5	11.6	8.3	15.1	
April	-	-	8	1	5	2	9	-	5	3	10	2	37	8	21.6	6.3	19.5	
May	-	-	1	-	7	1	10	5	5	2	11	-	34	9	26.4	4.	11.2	
June	-	-	8	1	5	2	10	1	15	3	11	-	49	9	18.3	6.2	17.6	
July	-	-	7	-	12	1	12	4	19	3	-	-	57	8	14.	7.9	21.6	
August	-	-	3	-	7	-	16	3	11	3	-	-	43	7	16.2	7.	20.	
September	-	-	2	-	3	5	10	1	16	4	-	-	33	11	33.3	6.	21.1	
October	-	-	3	1	5	-	17	2	14	-	-	-	47	3	6.2	6.5	11.1	
November	-	-	25	2	14	1	8	2	23	1	-	-	73	6	8.2	10.6	12.7	
December	-	-	25	6	16	1	10	1	28	8	-	-	93	18	19.3	15.1	27.2	
Total	27	5	109	14	99	20	134	26	170	33	77	15	616	113	18.3	8.1	20.7	
Per-centage of deaths on annual admissions	18.5		12.8		21.2		19.1		19.4		19.4							
Per-centage of admissions from dysentery on total annual hospital admissions	5.3		8.2		7.3		9.1		8.2		8.3							
Per-centage of deaths from dysentery on total annual hospital deaths	17.2		15.2		18.8		23.4		21.2		30.							

TABLE XXV.—*Tabular Statement of the Admissions and Deaths from Dysentery, in the European General Hospital at Bombay, for the Five Years from 1844 to 1848; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1844.		1845.		1846.		1847.		1848.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per Cent. of Admissions.	Admissions on Total.	Deaths on Total.
January	18	5	6	1	7	1	14	2	6	3	51	12	23.5	8.2	26.1
February	8	1	2	1	3	3	9	2	7	2	29	9	31.03	2.6	25.6
March	12	3	3	-	2	-	9	1	6	-	32	4	12.5	6.6	13.3
April	8	-	2	3	2	-	3	1	6	2	21	6	28.6	4.1	19.3
May	6	1	6	-	5	-	2	-	7	-	26	1	3.8	4.5	3.3
June	11	1	5	1	5	1	5	-	8	-	34	3	8.8	4.7	9.09
July	23	1	3	1	14	-	3	2	13	2	58	6	10.3	8.5	16.7
August	12	1	3	-	5	-	2	1	11	-	33	2	6.06	6.0	13.3
September	8	1	5	1	7	1	4	-	6	2	30	4	13.3	6.5	18.2
October	4	-	2	1	2	2	5	1	5	1	18	5	27.7	2.9	13.2
November	7	1	1	-	16	1	1	-	13	3	38	5	13.2	6.8	16.1
December	3	2	5	3	29	3	6	1	17	5	60	14	23.3	11.5	35.0
Total	120	17	43	11	97	12	63	11	107	20	430	71	16.5	6.3	18.4
Deaths on annual admissions	-	14.2	-	25.6	-	12.3	-	17.5	-	18.9	-	-	-	-	-
Admissions on total annual hospital admissions	0.69	-	3.1	-	6.9	-	5.9	-	8.5	-	-	-	-	-	-
Deaths on total annual hospital deaths	17.7	-	15.06	-	16.4	-	17.2	-	24.7	-	-	-	-	-	-

TABLE XXVI.—*Tabular Statement of the Admissions and Deaths from Dysentery, in the European General Hospital at Bombay, for the Five Years from 1849 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths per Cent. of Admissions.	Admissions on Total.	Deaths on Total.
January	14	3	10	4	3	2	24	8	5	-	56	17	30.4	12.4	43.7
February	1	1	10	1	-	-	8	1	4	1	23	4	17.4	6.2	22.2
March	7	1	6	3	4	4	7	1	3	2	27	11	40.9	6.1	32.4
April	13	1	9	2	5	1	3	2	7	-	37	6	16.3	7.2	24.0
May	6	2	4	-	8	-	4	1	8	2	30	5	16.7	5.8	20.8
June	10	1	4	3	12	-	3	1	8	1	37	6	16.3	6.4	20.7
July	8	1	11	-	11	3	6	2	10	3	46	9	19.6	8.7	27.3
August	5	2	10	2	5	1	9	1	12	2	41	8	19.5	8.3	21.6
September	8	1	5	-	6	-	2	1	1	3	22	5	22.9	6.2	20.0
October	7	2	8	2	4	1	4	1	4	2	27	8	29.7	6.8	34.8
November	15	2	7	2	15	4	6	1	4	-	47	9	19.2	8.9	30.0
December	21	6	6	1	19	7	5	-	10	3	61	17	27.8	10.03	42.5
Total	115	23	90	20	92	23	81	20	76	19	454	105	23.1	7.8	29.4
Deaths on annual admissions	20.0		22.2		25.0		24.7		25.0						
Admissions on total annual hospital admissions	9.9		8.2		8.6		7.2		5.7						
Deaths on total annual hospital deaths	28.05		25.3		29.1		32.2		33.9						

TABLE XXVII.—*Tabular Statement of the Admissions and Deaths from Dysentery, in the Jamsetjee Jeejeebhoy Hospital at Bombay, for the Six Years from 1848 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1848.		1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.		
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths on Total Admissions.	Deaths on Total Admissions.	Deaths on Total Admissions.
January	18	7	20	3	16	9	28	12	19	10	19	8	120	49	40.8	5.7	10.9
February	14	5	11	4	18	4	20	4	12	5	18	4	93	26	27.9	4.9	8.1
March	8	8	7	3	15	4	5	4	22	7	8	8	65	34	52.3	3.02	8.8
April	6	3	6	2	10	7	12	1	20	13	19	9	73	35	47.9	3.4	10.2
May	14	1	7	-	16	2	22	2	19	10	13	5	91	20	21.9	4.1	6.9
June	9	7	5	2	11	7	16	6	19	10	22	11	82	43	52.4	3.8	14.007
July	13	7	9	4	24	4	23	8	19	15	41	17	129	55	42.6	6.3	14.7
August	12	5	12	5	28	7	28	12	20	6	18	11	118	46	38.9	5.9	14.03
September	7	2	11	3	9	6	17	7	21	10	34	16	99	44	44.4	4.8	14.1
October	7	2	6	3	8	2	16	7	24	13	14	9	75	36	48.0	3.5	10.6
November	7	3	16	3	12	3	31	12	22	10	14	6	102	37	36.2	4.7	11.2
December	22	5	25	6	21	4	30	11	32	17	24	6	154	49	31.8	6.6	12.3
Total	137	55	135	38	188	59	248	86	249	126	244	110	1201	474	39.4	4.7	11.5
Deaths on annual admissions -	40.1		28.1		31.4		34.7		50.6		45.1						
Admissions on total annual hospital admissions -	3.8		3.3		4.04		5.6		6.02		5.5						
Deaths on total annual hospital deaths -	9.9		5.03		7.4		11.4		19.1		17.02						

TABLE XXVIII. — *Tabular Statement of the Admissions and Deaths from Diarrhœa, in the Jamsetjee Jejeebhoy Hospital at Bombay, for the Six Years from 1848 to 1853; with Per-centage of Deaths on Admissions; of Admissions on Total Hospital Admissions; and of Deaths on Total Hospital Deaths for the same Period.*

	1848.		1849.		1850.		1851.		1852.		1853.		Total.		Monthly Average.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Deaths on Total Admissions.	Deaths on Total Deaths.
January	8	2	11	8	19	11	25	10	21	3	18	7	102	41	40·2	4·9
February	4	2	15	7	7	2	16	6	14	9	9	4	65	30	46·2	3·4
March	6	3	10	10	5	3	14	7	12	7	10	9	57	39	68·4	2·6
April	9	3	13	5	8	4	17	5	12	4	14	1	73	22	30·1	3·4
May	10	4	17	7	13	1	15	4	14	4	14	4	83	24	28·9	3·8
June	6	-	14	7	13	2	29	9	13	4	18	3	93	25	26·8	4·5
July	8	3	20	7	27	13	19	6	13	2	35	13	122	44	36·4	6·04
August	13	3	20	8	26	17	14	12	18	6	19	15	110	61	55·5	5·5
September	6	2	27	7	16	6	16	10	13	2	13	6	91	33	36·2	4·4
October	14	3	28	9	16	7	12	6	13	4	28	11	111	40	36·04	5·2
November	10	3	20	11	17	6	16	1	14	5	16	4	93	30	32·1	4·3
December	13	8	20	4	14	2	22	8	13	8	22	6	104	36	34·6	4·5
Total	107	36	215	90	181	74	215	84	170	58	216	83	1104	425	38·5	4·3
Deaths on Admissions	-	-	41·8	-	40·9	-	39·07	-	34·1	-	38·4	-	-	-	-	-
Admissions on total annual hospital admissions	3·03	-	5·3	-	3·9	-	4·8	-	4·1	-	4·9	-	-	-	-	-
Deaths on total annual hospital deaths	6·5	-	12·9	-	9·2	-	11·2	-	8·8	-	12·8	-	-	-	-	-

CHAPTER VIII.

ON HEPATITIS.

SECTION I.

PRELIMINARY REMARKS ON THE NATURE OF THE SYMPTOMS OF HEPATIC DISEASE, AND A REFERENCE TO THE ANATOMICAL RELATIONS OF THE LIVER.—ARRANGEMENT OF THE SUBJECT.

IN distinguishing the important diseased states of the liver, we are very frequently not at all assisted by derangement of its function—that is, by altered conditions of the biliary secretion. In many diseases of the liver we are without evidence that the secretion is modified, and though it has been customary to relate various of the morbid appearances presented by the alvine discharges, to a changed state of the biliary secretion, and to infer from this the existence of hepatic disease; yet the proof of the accuracy of such conclusion is frequently insufficient, and the fact that the alteration may have been caused by the remedies which have been used, is often lost sight of.

It is, therefore, very necessary that the clinical student of hepatic disease should carefully avail himself of all other useful sources of information. Above all it is essential that he should bring to the inquiry a precise knowledge of the anatomical position and relations of the organ, and that this should be constantly present to his mind while he investigates its morbid states. Let him always recollect the following facts:—The liver

occupies the right hypochondriac, and part of the epigastric and left hypochondriac regions. It is protected by all the right ribs below the sixth. Part of the convex surface of the left lobe is in relation with the anterior parietes of the abdomen, and this lobe extends from two to three inches to the left of the median line. The part of the left lobe which is in relation with the anterior abdominal walls is in the epigastric region, just below the ensiform cartilage, and it varies in extent with varying positions of the body; in the recumbent position it extends about an inch below the cartilage. In the recumbent position the liver does not extend beyond the margin of the right false ribs, but it does so in a slight degree in the erect posture of the body and under full inspiration. The convex surface of the organ, both of the right and left lobe, with exception of that part of the latter which is opposed to the anterior walls of the abdomen, is in relation with the diaphragm, which muscle is interposed between the liver and the base of the right lung and the heart; but the convexity of the liver with the diaphragm interposed fits accurately into the concavity of the base of the lung. The thin edge of the concavity of the lung extends in expiration to about the sixth rib anteriorly, but reaches as low as the seventh on inspiration. Posteriorly, however, the lung on expiration reaches to the seventh rib, and on inspiration to the eighth or even lower. Then the important organs with which the concave surface of the liver is in relation must also be borne in mind; that of the right lobe, with the top of the ascending colon, part of the duodenum, and the upper end of the right kidney; that of the left lobe, with the pyloric end of the stomach, and with much of the anterior surface of its body, when the stomach is empty.

It is since the practice of percussion has been added

to our means of investigating disease, that this precision in respect to the position of the liver, has acquired its full value; for by percussion we can ascertain during life the normal limits of this organ, and any excess or diminution of them that may have taken place. In the normal state there is dulness on percussion from the sixth right rib, downwards to the costal margin. The degree of dulness between the sixth and the seventh rib will vary according as observation is made under expiration or inspiration. Percussion about the fifth, sixth, and seventh ribs should always be gentle, because as the most convex part of the liver rises as high as the level of the fifth rib, strong percussion will indicate dulness, higher than the sixth rib, and will prevent us from determining whether the liver is normally or otherwise overlapped by the thin part of the lung.

Then there are leading facts in respect to the intimate structure of the liver, which must be held in remembrance. The arrangement of the portal capillaries, the position of the portal vein, and its branches in the portal canals. The origin of the hepatic vein radicles in the lobules, and their relation there to the portal capillaries. The distribution of the hepatic artery. The situation of the origin of the hepatic ducts. The supposed function of the hepatic cells, and their relation to the terminal parts of the ducts. Nor must we forget that by far the larger proportion of its blood supply flows through the portal vein to serve the purpose of secretion; that a much smaller portion circulates in the hepatic artery to serve for the nutrition of the solid tissues of the organ, and then to mix with the portal blood, and thereby, also, to contribute to secretion. The liver is also abundantly supplied with lymphatics, and with nerve fibres, chiefly derived from the sympathetic system.

In treating of the inflammatory affections of the liver I shall use the terms *Hepatitis* and *Cirrhosis*. By *Hepatitis* I understand inflammation of the peritoneal covering of the organ, of its substance, or of both combined. When in the first situation, it may be recovered from with, or without lymph exudation and consequent adhesion. When in the second situation, it may be recovered from, and the organ be left sound; or lymph exudation may take place, and abscess result from its degeneration.

The symptoms will be distinct or obscure, and the morbid process will follow a quick or a slow course, and will tend to recovery or degeneration according to the part and extent of the organ implicated, and the diathesis of the individual affected.

The term *Cirrhosis* I use in its ordinary acceptation, and apply it to the issue or the progress of that slow inflammatory action which invades the fibrous and areolar tissues of the portal canals, and is generally related to spirit drinking as a cause.

I prefer these terms to "suppurative inflammation," and "adhesive inflammation," because the former, as a substitute for hepatitis, does not include the cases of peripheral inflammation, and seems to imply that every inflammation of the substance of the liver not of the character of cirrhosis necessarily ends in suppuration—a conclusion to which the observer of disease in India is most surely unable to accede. My objection to the term "adhesive inflammation" as restricted to cirrhosis is, that it would be more correctly applied to those numerous inflammations, primary or secondary, of the peritoneal covering of the liver which lead to lymph exudation and consequent adhesion of surfaces.

I proceed now to the subject of this chapter, viz. *Hepatitis*, and shall consider 1st the pathology; 2nd the causes; 3rd the symptoms; 4th the treatment.

SECTION II.

PATHOLOGY.—PRELIMINARY REMARKS ON THE GENERAL PATHOLOGY OF HEPATITIS.—MORBID ANATOMY OF STAGE OF VASCULAR TURGESCENCE, LYMPH EXUDATION, AND FORMATION OF ABSCESS, EXPLAINED.—THE SEVERAL COURSES AND SITUATIONS OF RUPTURE OF HEPATIC ABSCESS. — ABSCESS ABSORPTION. — SECONDARY PERITONITIS, AND FORMATION OF CIRCUMSCRIBED PURULENT SACS. — SECONDARY PLEURITIS CIRCUMSCRIBED AND GENERAL EMPYEMA.—SECONDARY PERICARDITIS.—GENERAL SECONDARY PERITONITIS. — COLOUR OF PUS IN HEPATIC ABSCESS.

PATHOLOGY.—Before proceeding to describe the morbid anatomy of hepatitis, I am desirous of noticing a preliminary pathological question which it seems to me is of some interest and importance, and which, so far as I know, has not engaged the attention of previous writers. Which are the capillary vessels of the liver concerned in the morbid action to which we give the name inflammation? The answer is, I apprehend, sufficiently clear. If the pathological doctrines at present received in respect to inflammation be correct,—viz. that it is an altered state of the nutritive processes of the part affected, depending upon something faulty in one or other of the conditions of normal nutrition,—then the capillaries concerned in inflammation must necessarily be only such as circulate, in their normal state, *arterial* blood for purposes of nutrition. The capillaries of the hepatic artery are the nutrient vessels of the solid structures of the liver, and conse-

quently those alone which can be directly engaged in the inflammatory processes of those structures.* On the other hand, the portal capillaries circulate venous blood for purposes of secretion, and have no concern, as we believe, with the nutritive processes of the organ; they are therefore not *directly* engaged in inflammation. Now this is not a question of mere curiosity. Firstly, if we regard the small capacity of the hepatic artery capillaries in comparison with those of the portal vein, we have, under the view that the former are those concerned in inflammation, an explanation of the fact that the bulk of the organ is little increased compared with that to which it attains in congestion—a deranged state in which the capacious portal capillaries are directly implicated. Secondly, this view helps to explain how it is that frequently the secretory function of the liver is not deranged in hepatitis. Thirdly, it tends to remove that difficulty which practical writers on hepatitis have more or less experienced in reconciling the results of clinical observation to therapeutic theory. It has been urged that to give mercury with a view to its cholagogue action in hepatitis is contrary to that general therapeutic principle which teaches that the special stimulants of secreting organs are contra-indicated in the active inflammations of these organs. But this principle—doubtless true when the secreting capillaries and the inflamed capillaries are the same, and

* I am aware that it may be urged that the hepatic cells must be classed with the solid structures of the liver, and that (viewing the close analogy between secretion and nutrition) in one sense it may be said that they are nourished by the portal capillaries. But this is apart from the argument, and the usual meaning of nutrition, which, speaking generally, is a process requiring as one of its conditions arterial blood and arterial capillaries.

carrying arterial blood,—is surely without application in the instance of the liver, if we believe that the secreting capillaries and the inflamed capillaries are altogether distinct. Further, if we hold that the hepatic artery capillaries finally communicate with the portal, then to quicken the portal capillary circulation by increasing secretion from its blood, seems in theory a good way of lessening the stagnation in the capillaries of the hepatic artery. I make these observations at the present moment, not with any view of advocating the mercurial treatment of hepatitis, for this question will be discussed elsewhere; but simply with the object of showing that the question—which are the capillary vessels engaged in inflammation is not an idle one, but has relation to the therapeutics, as well as to the physical signs, and the symptoms of hepatitis.

I now enter upon the consideration of the *morbid anatomy* of hepatitis. The first circumstance to keep before us is the great size of the liver, and the consequent fact that inflammations will vary according as they involve a greater or less extent, and one or several parts of its substance or surface.

That inflammation of the capsule of the liver, with but little implication of its parenchyma, is a real form of disease, is not to be questioned. We may believe that in some instances recovery takes place without leaving behind in the structures any trace of the previous disorder. We know that in other instances it causes adhesions between the opposing peritoneal surfaces, or an opaque and thickened state of the peritoneal covering of the liver unattended by appreciable change of its parenchyma. We know this from the appearances occasionally found in bodies after death; but from the rarity of these appearances, at least in India, we are

justified in concluding that inflammation *limited* to the periphery of the liver, is not a common form of disease in that country. This is the general belief, and a review of my own cases serves to confirm it. Yet it is a subject to which the attention of future pathologists should still be directed, for in recorded cases (my own as well as others) there is often a want of precise and distinct information on this point. I need hardly observe that at present no reference is made to the almost universal coexistence, at one period or other, of inflammation of some part of the peritoneal covering of the liver with inflammation of its substance: its absence is exceptional, just as in the instance of the lung and the pleura.

When the substance of the liver is the seat of inflammation, then we have first a stage of vascular turgescence analogous to the first stage of pneumonia. This may be resolved by treatment, or may pass on to interstitial lymph exudation and its ulterior changes. These morbid processes may invade portions of greater or less extent, from the size of a pea to that of an orange and upwards; and in number from one to many.

It can be but seldom, if ever, that a universal inflammation of the liver substance occurs. The opportunities of observing the appearances presented by inflammation of the liver in its first stage—that of vascular turgescence—are necessarily limited, for death seldom occurs at this early period of the disease. Still the occasional instances of death from some other cause, when the first stage of hepatitis is present (case 17.), and the observation of the state of those parts of the liver which surround lymph exudations, enable us to determine with tolerable confidence the general character of this appearance. The structure of the liver is observed to be redder and to be softer than natural, and

to bleed when cut; Rokitansky adds, that it is largely granular.

I do not speak now of large dark-red livers, lacerating easily, and breaking down into a bloody pulp, described by the older writers on tropical disease, and by them considered to be the organ in a state of inflammation. These were not appearances caused by inflammatory action, but were conditions of the liver found in fatal cases of congestive malarious fever in full-blooded Europeans, and caused by accumulation of deteriorated blood in the capacious venous systems of the organ.

But, under the continuance of inflammation, we cannot expect that the morbid process will long remain in the state of mere vascular turgescence. It is to be apprehended that interstitial exudation of coagulable lymph of varying extent will follow. Still, so long as the lymph remains in the liquid form in which it is first exuded (the limits of which term we do not yet know), there is hope that complete recovery may take place by re-absorption and resolution. When, however, the lymph has coagulated in the interstices of the parenchyma, then the issue must be in one of the three following courses :—

1st. The liquid parts of the exudation may be absorbed, and the solid lymph become organized into fibrous tissue. This termination presupposes a good diathesis, exudation of limited extent, and the return of the surrounding liver parenchyma to its normal state of capillary circulation. We have evidence, I believe, of this occurrence in the fibrous nodules or patches that are sometimes found in the liver after death. (184, 185.)

2nd. The exuded lymph, instead of becoming organized, may degenerate, re-liquefy, be absorbed, and

disappear. This termination is only likely to occur in a good diathesis, when the exudation has been of limited extent, is recent, surrounded by tolerably normal structure, has not been circumscribed by an organized layer, and has not been so copious as materially to interfere with the vitality of the tissues amid which it has been exuded. And here a therapeutic question may be parenthetically asked. Is it not reasonable to suppose that it is in this state and stage of lymph exudation that mercurial influence is useful; and that it is so by favouring this *degree* of degeneration of the lymph by which it is re-liquified, and which is *one* of the conditions essential to its re-absorption?

3rd. The lymph degenerates into pus, the tissues amid which it has been deposited also degenerate, liquefy and disappear, and the whole becomes more or less circumscribed by lowly-organized membrane. Hepatic abscess has formed. This termination is favoured by the extent of the structure involved, the severity of the inflammatory action, the copiousness of the exudation, and, above all, by the diathesis of the individual affected, and sometimes by the nature of the cause.

The opportunity occasionally presents itself of distinctly tracing in the liver the changes from vascular turgescence to the formation of abscess. This I have been enabled to do in several instances; and the following are the appearances which have come under my observation.

A part of the substance of the liver shows a limited portion of vascular turgescence redder and softer than the surrounding structure. Another portion exhibits a similar appearance, but with this addition, that in the centre there is a circumscribed part of fawn yellow colour of moderate texture, caused by lymph

exudation in the central part of the inflamed tissues. Then, in another part, there may be a similar fawn-coloured circumscribed portion, but with this difference, that it is softer and friable in the centre, indicating that the exuded lymph has begun to degenerate into pus. Then, in a more advanced stage, the centre of these fawn-coloured deposits becomes broken down, and converted into pus; the parts immediately adjacent to the pus being shreddy and flocculent, those still beyond fawn-coloured and firm, bounded by reddened parenchyma, with healthy structure beyond. Then, in a still more advanced stage, we find that the outer layer of lymph has become organized, in varying degrees, into a membranous investment, and the central parts—lymph and tissue—have more or less completely degenerated into pus, more or less laudable according to the diathesis of the individual. But even in this stage we not unfrequently find the inner surface of the investing membrane roughened and flocculent from portions of the vascular or other tissues of the organ, which, having escaped degeneration, remain in a condition more or less organized, and form nuclei round which flakes of shreddy lymph have clustered.

But the history of the abscess is not yet completed. More lymph exudes from the inner surface of the investing membrane, and degenerates into pus. The sac becomes distended, the bulk of the liver increased, and tumefaction takes place in different directions, according to the situation of the abscess. Adhesion of opposing serous surfaces follows; then thinning of the abscess wall on one side by interstitial absorption succeeded by pointing and rupture. Sometimes the tendency to point and to rupture is counteracted by the sac becoming thickened and strengthened in the following

manner. The substance of the liver surrounding the sac becomes compressed from increase of the contents, and, in consequence, the lobular structure, for two or three lines around, becomes atrophied and disappears and its connecting tissue remains. (200. 219. 221.)

The completion of the processes which have been described,—that is, the formation of an outer organized membrane, and of the central lymph and tissues into pus, the adhesions, interstitial absorption, and rupture,—must depend on the constitution of the individual, the size and number of the abscesses, and the judgment displayed in the medical treatment. In the greater number of hepatic abscesses death takes place while these processes are yet in progress.

In this description of the formation of hepatic abscess, sketched from actual observation, we have nothing different from what occurs in the course of an ordinary phlegmonous abscess in a good constitution : those parts of the lymph most remote from the living tissues—the central—degenerate into pus ; those adjacent to the living tissues—the peripheral—become organized into membrane.

Without pretending to assert that this is the only way in which abscesses of the liver are formed, I am very certain that it is the most common. It readily explains the circumstance that these abscesses are frequently not single, and, when several, are often observed to be in various stages of progress. Though it is no doubt true that large abscesses are sometimes formed by coalition of several adjoining small ones, still I do not concur with Rokitansky in considering that this is the only mode ; for I think there can be no doubt that large hepatic abscess has sometimes its origin in a single extensive lymph exudation.

In these remarks no reference has been made to the occurrence of diffuse suppuration of the liver. In fact, I have no knowledge of it. The absence of circumscribing tissue may be observed in that stage when, as yet, the lymph has not all broken down ; but when the degeneration into pus has been nearly completed, there is, according to my observation, always a limitary tissue of some kind.

The cases which follow (195. to 204.) will be found to illustrate, in some degree, the remarks which have now been made ; also 228. 249. 250. 251. 258. 265, 266. 268, 269. 276 308.

195. *Abscess in the Brain not suspected during Life.—Abscess in the Liver, with Pneumonia of the lowest Lobe of the Right Lung, revealed by Symptoms.—Vascular Turgescence of Liver.*

Thomas Saunders, boiler maker, aged thirty-six, of stout habit, was admitted into the European General Hospital, on the 9th August, 1838. He had arrived lately in India, and had suffered whilst in England from pain of his right side. He had been ill for five days before admission with pain of head, side, and limbs. These symptoms had lessened, but the pain of the right side had increased much the night before admission, and it was that of which he chiefly complained ; it was at the margin of the ribs, was accompanied with cough and impeded full inspiration. After free leeching the warm bath and purgatives, the side became easy ; but the pain continued to recur from time to time, was attended with headache and frequent pulse, and the skin was frequently hot towards evening. He was dull of hearing on admission ; his manner was slow and undecided, and his hands were frequently tremulous ; his spirits were depressed, and the pulse was easily excited. The bowels were kept free by mercurial and other medicines ; leeches and blisters were applied, and quinine was at different times given. On the 1st September it was thus reported : Is still nervous, but makes no complaint of pain ; the pulse is easily excited ; there is greater fulness of the right hypochondrium than of the left, and the nipple is on a lower level than that of the left side. About two inches below the right nipple, laterally, and posteriorly

below the inferior angle of the scapula, there is dulness on percussion; the respiratory murmur is obscure, with occasional sibilus and crepitation; the latter, smaller behind and rather subcrepitous laterally. On the left side of the chest there is occasionally sibilous and mucous rhonchus; there is no cough. Subsequently the cough became troublesome, and the pulse frequent, and on the 16th he became drowsy for the first time, then insensible, and died at 7 P.M.

Inspection twelve hours after death.—*Head.* In the anterior and middle lobe of the right hemisphere there was an abscess of considerable size, the inner surface having in parts a red fungous appearance; and the surrounding substance of the brain was softened.—*Abdomen.* The substance of the liver was red and softened, and adhered to the ribs and the diaphragm; on separating the latter adhesion, a small abscess was discovered, and opposed to it the lung adhered to the diaphragm. The lowest lobe of the right lung was hepatized, and the left lung was congested with blood.

196. *Hepatitis.—Several Abscesses in the Right Lobe.*—

Nodules in the Left Lobe.—The Mucous Coat of the Colon ulcerated.—Serous Effusion in the Head without Symptoms.

John Robinson, aged twenty-six, a seaman, tall and fair, was admitted with symptoms of acute hepatitis on the 7th February, 1840. He stated that he had been ill since the day before admission. He was freely bled at the arm, and very freely leeches, mercury was used internally and externally without inducing ptyalism. On the 12th there began to be evening febrile accessions, which continued. On the 15th there was fulness at the margin of the right ribs with hepatic sound an inch below them and to two inches from the nipple. The fulness of the side increased, he became sallow and emaciated. The dejections were generally light yellow and thin. The breathing became oppressed, and he died on the 22nd.

Inspection.—*Head.* There was a thin veil of serum on the convex surface of the brain, and an ounce at the base of the skull.—*Chest.* The lungs were emphysematous, and the liver encroached on the chest to the level of the fourth rib.—*Abdomen.* There were no adhesions between the concavity of the diaphragm and the surface of the liver. In the right lobe of the liver there were several abscesses, each the size of an orange. There was one to the right of the mesial line and superficial; two were

at the concave surface of the lobe, and their walls were in close adhesion with the hepatic flexure of the colon. The inner surface of the walls of the abscesses had a very flocculent appearance when floated in water. The left lobe filled the left hypochondrium, was of pale colour, and presented whiter defined portions the size of a pea, like tubercles in appearance, but not so hard in texture. The colon was studded with closely set circular ulcers, some of them sloughy; where the adhesions to the liver were, there the ulcerations had advanced furthest. At the end of the ileum there was granular yellow lymph effused.

197. *Dysentery complicated with Delirium Tremens.*—*Milkiness of the Arachnoid.*—*Matting of the Omentum over the Colon.*—*Numerous Sloughy Ulcerations of the Mucous Coat of the Cæcum.*—*Many Abscesses in Liver.*

Cornelius Moriarty, aged forty-six, a Serjeant in the Grand Arsenal, a man of dissipated habits, and in hospital at different times with gastric affections. Before admission into hospital on the 7th November, 1840, he had been drinking to excess; when admitted, he complained of much tenderness of the right iliac region, for which five dozen leeches were applied and a calomel and opium pill given, followed by castor oil. When seen by me some hours afterwards, the bowels had been opened, the abdomen was still tender, the pulse feeble, the hands tremulous, and the tongue florid. The abdomen was directed to be well fomented; an enema was ordered, if necessary, and calomel four grains with a grain and a half of muriate of morphia were given at bed-time, and castor oil directed for the following morning. He did not sleep, and on the 8th, the tongue and hands were more tremulous, the tongue was somewhat coated in the centre. He had vomited frequently, and there was tenderness at the margin of the right ribs. Thirty-six leeches were applied, and afterwards a blister, and calomel three grains and muriate of morphia one grain were given every three hours for three doses, and an ounce of port wine every two hours. The vomiting ceased. Otherwise, no change. At bed-time cold affusion to the head, and a hot foot-bath were used, and calomel three grains and one and a half of muriate of morphia exhibited, and, after two hours, directed to be repeated should sleep not have taken place. He was purged during the night and did not sleep, but vomited frequently. On the morning of the 9th the skin was above the natural temperature, the tongue continued florid at the edges and tip. There was still considerable tender-

ness between the margin of the right ribs and the crest of the os ilium. Thirty-six leeches were again applied, and effervescing draughts, with tincture of opium twenty minims, were given every two hours. *Vespere* no purging or vomiting, abdomen easier, the hands still tremulous, the pulse weak, and he began to labour under illusions. The effervescing draughts were continued, calomel and quinine each two grains, with muriate of morphia one grain and a half, were given every second hour till three had been taken. At 9 P.M. the skin being coldish, mulled wine was exhibited. On the 10th the skin was moist, the pulse of better strength, the pupils contracted, the tongue still coated in the centre, florid at the edges and tip. A blister was applied to the nucha, the effervescing draughts were continued during the day, and sago and wine were given. The bowels were moved several times, and at 9 P.M. there was drowsiness and oppressed breathing. The head was shaved, and a large blister applied to the scalp. He died without convulsion or much coma at 10 A.M. of the 11th.

Inspection five hours after death.—*Head.* No vascular turgescence of the membranes. There was milky appearance of the arachnoid membrane, and slight effusion between it and the pia mater on the convex part of the brain, and a greater than usual number of granules at the dipping down of the falx. There was about an ounce and a half of serum at the base of the skull.—*Chest.* The lungs did not collapse in consequence of emphysema in different parts, but there was no other morbid appearance. The heart was healthy.—*Abdomen.* The omentum was matted over the transverse and descending colon and cæcum, and by its adhesions had caused angles in the course of these portions of the gut. An ulcer had almost perforated the cæcum, and was opened on the separation of the adhesions which patched it. The liver enlarged, was mottled yellow, was brittle and hard in texture, and seven or eight small abscesses were detected; the largest was the size of a walnut, the others the size of horse-beans; the smaller ones were occupied with thick adhesive pus, the large one had the appearance of parenchyma infiltrated with purulent matter, but not yet broken down, and the surrounding texture was mottled red, and more friable. The mucous coat of the stomach at the pyloric end was mammillated and thickened. At the cardiac end it presented a rosy tint, but was sound in texture. The end of the ileum and the large intestine were laid open. The mucous coat of the end of the ileum was healthy. The cæcum and ascending colon were thickened and cartilaginous, with extensive sloughy

ulceration. The rest of the colon presented a reddish tint with here and there an ulcerated follicle. At the very end of the rectum there were two large sloughing ulcers. The sigmoid flexure of the colon was a good deal dilated. The kidneys and spleen were healthy.

198. *Illustrates Formation of Abscess from breaking down of Lymph Deposit.—Pus tinged with Bile.—The Corpuscles Granular and broken down.—Surrounding Turgescence.*

The liver of a dysenteric patient with abscess was sent to me from the European General Hospital. In the right side of the right lobe there was a part, the size of a large orange, the centre pulpy and broken down; around it for quarter of an inch, there was a thick layer of buff-coloured structure, around that for some distance an engorged part. In one other place there was a yellow-buff portion the size of a bean without central pulpy state. The rest of the organ was healthy. Hepatic cells were distinct under the microscope. In the central pulpy part the puriform fluid was tinged yellow (bile); examined under the microscope the biliary tinge was very marked, and the corpuscles in greater measure had separated into their constituent granules.

199. *Hepatitis.—Abscesses,—in one, breaking down of the Parenchyma; in the other the Deposit in the Interstitial Tissue had not yet broken down into Pus.—Mucous Coat of the Colon Dark Red, and covered with firm Granular Exudation.*

Richard Cox, aged forty-six, a seaman of the ship "Tweed," was admitted on February 4th, 1841. He stated that he had ailed for a week with dry cough, increased during the two days previous to admission and attended with pain at the lower part of the chest, extending to the epigastrium and attended with pain on pressure. Pulse frequent. Skin dry. He was bled once and leeches frequently: took calomel in ten-grain doses. The pain never ceased, though it was relieved. The mouth did not become affected. There was not much purging, but the skin became washy, pulse feeble, countenance collapsed, and he died on the morning of the 12th.

Inspection six hours after death.—Chest. There were old adhesions of the pulmonary to the costal pleura on both sides.
—Abdomen. On the lateral part of the right lobe of the liver

there was a superficial abscess, giving out, when incised, dark reddish serous fluid; the inner surface of the sac was yellow and flocculent. About the middle of the anterior part of the right lobe, there was a somewhat prominent part, which, when incised, showed a yellow substance the size of a walnut softened in the centre, firmer beyond. The parenchyma of the liver was generally mottled buff. The mucous coat of the colon presented a dark red surface throughout the greater part, covered with a yellow granular firm exudation with frequent traces of ulceration. There was commencement of yellow deposit in one of the kidneys.

200. *Hepatitis.—An Abscess lined by firm Membrane in the Right Lobe.—Several Nodules in different Places of the Liver; in some Suppuration commencing at the Centre.—Traces of Ulceration in the Colon.—Granular Exudation on the Mucous Coat of the Rectum.*

John Richard Pauper, aged twenty-six, an Indo-Briton, was admitted on the 29th January, 1841. He stated that for three weeks he had suffered from pain of the right hypochondrium, increased much during the two days previous to admission. The pain prevented full inspiration and decubitus on the right side. The pulse was badly developed, and frequent. He was leeches and blistered, and an attempt was made to affect the system by the moderate exhibition of calomel and opium, with mercurial inunction. The pain was much relieved, never, however, completely removed. No fulness at the margin of ribs occurred. The gums became swollen, but he was never fully under the influence of mercury.

On the 1st February, dysenteric symptoms were first complained of, and followed the exhibition of a seven-grain dose of calomel. There was a good deal of tenesmus, for some days, which ceased about the 5th. After which the bowels were moved generally seven or eight times in the twenty-four hours: the dejections being brown and watery. He lost flesh. From the 8th, the treatment was chiefly palliative, anodynes with quinine and light nourishment. He died on the 17th. Rigors are not noted as having occurred, in any of the reports.

Inspection eighteen hours after death. Body emaciated. — *Head.* There was a thin veil of serum on the convex surface of the brain. — *Chest.* The right lung was emphysematous, and adhered by tender adhesions to the diaphragm. The left

lung was bound by old adhesions closely to the costal pleura. — There were no tubercles in the lungs. The heart was healthy. — *Abdomen.* The liver did not extend beyond the ribs. The surface was of buff colour externally and internally. The lateral part of the right lobe adhered to the concavity of the ribs; and underneath the adhesions, there was an abscess the size of an ostrich egg, containing about twenty ounces of thick pus; it was lined by a firm cartilaginous membrane, beyond which, for three or four lines, the substance of the liver was cartilaginous and condensed. From the surface of the lining of the sac, loose flocculi depended and were easily scraped off with a knife. Elsewhere, here and there, in both lobes were round, buff yellow defined portions, from the size of a tare to a horse-bean, some consistent throughout, others with a drop of pus in the centre. The mucous coat of the colon was pale with traces of ulcers in process of cicatrization. In the rectum there was granular lymph. The mucous coat of the pyloric end of the stomach was mammillated; at the cardiac end there were dark brown ramifications, but the texture of the coat was sound. The kidneys were healthy.

201. *Hepatitis.* — *Two large Abscesses from Degeneration of Lymph and Tissue.* — *The Liver mottled Buff.* — *The Mucous Coat of the Colon Dark Grey with Red Patches, and several Ulcers.* — *The Kidneys malformed.*

James McMartin, aged thirty-eight, of the ship "Ingleborough," was admitted into Hospital on the 2nd February, 1841. He stated, that for a fortnight previously he had suffered from dysenteric symptoms, and passed blood for several days. There was much tenderness across the abdomen. Pulse 100, irritable. He was bled to sixteen ounces, and freely leeches. The blood was cupped and sisy. During his stay in hospital, the pain was chiefly about the margin of the right ribs, shooting downwards to the iliac region, or backwards, or towards the epigastrium. Latterly there was distinct fulness and tenseness at the margin of the ribs. On the 4th, there was a distinct febrile paroxysm with rigors. The dysenteric symptoms were little urgent till the 12th, when a considerable quantity of brick-red puriform matter was dejected, and continued till his death, on the 14th. At first, the case was treated as one of dysentery, and the ipecacuanha pills were given; but they were rejected, and in consequence omitted. When it became clear that it was the liver that was chiefly affected, an attempt was made to induce

the action of mercury on the system, but it caused irritation, and was not persisted in. He was leeches and blistered; latterly wine with quinine and opium were given.

Inspection twenty hours after death.—*Chest.* The lungs were emphysematous but otherwise healthy; no costal adhesions or adhesions to the diaphragm.—*Abdomen.* There were two large abscesses in the liver. One to the right of the gall-bladder, its anterior and lateral walls very thin, and opposed to the abdominal parietes, and the concavity of the false ribs, its lower wall (the concave part of the liver), and the fundus of the gall-bladder adhered firmly to the hepatic flexure of the colon: but there was no communication with the gut. The other abscess, the size of a large orange, was in the centre of the right lobe. There were no adhesions to the diaphragm. The contents of both abscesses were dark brown and quite serous. The inner surface of the abscess-sacs consisted of broken down adherent flocculent substance. The rest of the liver had a bright buff mottled appearance. The walls of the colon were not thickened. The mucous coat was dark grey with dark red patches and numerous extensive superficial ulcers. There was a malformation of the kidneys,—the two kidneys were connected, and in a horse-shoe form, the convexity downwards, extended across the abdomen, before the vessels and behind the mesentery; the whole length about ten inches; the transverse part about one inch and a half broad. Throughout the whole extent the cortical and tubular parts might be traced, but the texture was soft and yellow, and probably altered by disease. There were two ureters following their usual course.

202. *Abscess in the Liver.*—*Sac smooth without Flocculi.*

—*Large Intestine, with Sloughy Ulceration of the Mucous Coat.*—*Complicated with Intermittent Fever, which, at the Commencement, was the prominent Feature.*—*Several Lymph Nodules.*

David Hopkirk, Indian Navy, aged twenty-six, was admitted on the 15th December, 1840, under the head of intermittent fever, and died on the 9th February. He had been ill for three weeks before admission, and had been affected with regular febrile paroxysms. There was also pain, increased on pressure, at the upper part of the abdomen. The chief symptoms during his residence in hospital were the frequent recurrence of this abdominal pain with occasional febrile paroxysms with rigors

at first, tendency to dysenteric symptoms, marked during the last ten days by considerable purging and tenesmus, with gradual loss of flesh. He was never brought fully under the influence of mercury, though calomel was given freely with this intention. He was bled freely, leeches and blistered. There was *clavus hystericus* at one time, the result probably of the depletory measures.

Inspection eight hours after death.—Body emaciated.—*Head.* Brain pale, with about four drachms of serum at the base of the skull.—*Chest.* The lungs were emphysematous; and there were old adhesions of the right lung to the costal pleura. The heart was healthy.—*Abdomen.* The omentum spread over the intestines, adhered to the brim of the pelvis and to the cæcum. In many places, the intestine, chiefly the cæcum, and sigmoid flexure, was black and friable. The inner surface of the gut, throughout, presented a ragged sloughy appearance with hardly a trace of the mucous coat. The lateral part of the right lobe of the liver adhered to the parietes, and, at the point of adhesion there was a superficial abscess, the size of an ostrich egg; the sac lined with a firm membrane with smooth surface. Around the abscess, in the parenchyma of the liver, were several yellow points, the size of a pin's head; and in the centre of the right lobe there was one, the size of a horse-bean. The liver was red and firmer than natural. The mesenteric glands were generally enlarged, many of them being larger than an almond. In the kidneys yellow degeneration had advanced considerably; in one it was uniform; in the other it was striated.

203. *Hepatitis, ending in Abscesses by Lymph Exudation and Degeneration.*

Archibald McLean, a boiler-maker, aged thirty-two, not many months resident in India, formerly the subject of hepatitis. Before admission into hospital on the 27th December, 1840, he had suffered from dysenteric symptoms for five days. There was tenderness at the epigastrium, and margin of the right ribs, painful decubitus on the left side, excited pulse; nausea, &c. He was freely bled and freely leeches, and calomel given, ineffectually, with the view of inducing ptyalism. The disease was unsubdued. He died on the 10th January.

Inspection.—*Abdomen.* There were adhesions of the liver to the small arch of the stomach. In both lobes there were several abscesses, the largest the size of an orange. They did not form distinct sacs, but seemed to consist of a breaking down of the parenchyma, by purulent infiltration into the areolar tissue

which connects the ramifications of the terminal cœca of the secretory substance.

The large intestine was in part ulcerated.

204. *Large Hepatic Abscess, with Shreddy Flocculent Walls and surrounding Vascular Turgescence. — No Intestinal Ulceration.*

Shaik Abdo, forty-three years of age, a Mussulman, servant in a grog-shop, using spirits freely, of somewhat emaciated frame, after ten or twelve days' illness, with pain of right side, cough, and daily double febrile accessions, was admitted into the clinical ward on the 29th November, 1848. There was dry cough, hiccup, tenderness below the right ribs, a yellow coated tongue, with florid edges, high-coloured urine, relaxed bowels, and febrile disturbance. There was a sense of induration with dullness in the epigastric region, and below the margin of the right ribs to within about an inch of the umbilicus. These symptoms continued with aggravation of the diarrhœa, and he died on the 8th December. He was treated with leeches over the tender part, followed by a blister, and calomel three grains, ipecacuanha one grain, opium half a grain every fourth hour. Slight fulness and tenderness of the gums on the 4th.

Inspection eleven hours and a-half after death. — Chest. Both lungs collapsed, and were crepitating. *Right Lung.* There were old adhesions between the upper lobe and the costal pleura. The base of the lung adhered to the upper surface of the diaphragm, by recently effused lymph, and the lateral surface of the third lobe to the opposite costal pleura.—A portion of this lobe was œdematous. No adhesions of the left lung. The heart and pericardium were healthy.—*Abdomen.* The liver was so much enlarged as to reach on the right and left sides to the level of the tenth and eleventh ribs, and to a point about two inches above the umbilicus. There were tender adhesions between the right lobe and the diaphragm; also between the gall-bladder and the adjacent border of the right lobe of the liver and the colon, as well as between the lower surface of the liver and the duodenum. An abscess occupied the lower and posterior part of the right lobe, and was very superficial at the lateral part, so that the walls which had contracted adhesions with the opposite parietal peritoneum gave way and remained adherent to the latter, and seemed to consist only of the visceral peritoneum thickened. The abscess was large, about the size of a cocoa-nut, and contained pus with abundant shreddy looking

flocculi. The portion of the substance of the liver surrounding the abscess was red, and the rest was mottled white and red, and was very firm under the knife. The ascending colon passed obliquely upwards and inwards to the notch in the anterior border of the liver and to the gall-bladder, and thence the transverse part stretched downwards towards the left iliac fossa, close to the anterior superior spinous process of the os ilium, and thence it passed upwards, then downwards, as the descending colon. No disease of the large intestine, except that its mucous membrane was thinner than natural, and softer in parts; it was not ulcerated. The stomach was quite concealed by the liver, and pushed more towards the left side than natural; it was also very contracted, so much so that it appeared no larger than the intestine. Kidneys healthy in structure. Cranium not opened.

COURSES FOLLOWED BY HEPATIC ABSCESS.

Having traced the manner in which abscess in the liver is formed, I shall now pursue the further course of the disease, and describe the different directions in which the abscess may point and rupture.

1st. Hepatic abscess may open into the lung or sac of the pleura.

2nd. Into the stomach, or some part of the intestinal canal.

3rd. Into the pericardium.

4th. Into the hepatic ducts.

5th. Into the cavity of the peritoneum.

6th. Externally on the surface.

I shall, in this place, notice the five first directions, and leave the sixth to be considered in connexion with the question of puncturing hepatic abscess as a part of treatment.

Into the Lung or Sac of the Pleura. — As the right lobe of the liver is the most common seat of abscesses, and as they are frequently formed not far distant from the convex surface of the organ, we might expect that the tendency to point in the direction of the diaphragm,

and open through it, would not be an uncommon occurrence. It is, according to my observation, the direction in which hepatic abscess most frequently opens; even more so, I believe, than on the external surface. When the abscess has been small, single, not deep, and the constitution of the individual tolerably preserved, then there is a fair chance of recovery from abscess communicating with the lung. On the other hand, when the abscess is large or not single, and the constitution is either originally bad, or much reduced by disease, then a fatal issue, with exhausting hectic, fever is the termination to be looked for.

The most satisfactory results of hepatic abscess communicating with the lung are those given by Mr. Stovell.* He cites eleven cases, — six were recoveries, —and the symptoms presented by the successful cases justify the inference, that the abscess in each had been small and single. My own notes do not furnish me with results so satisfactory as these; for, of the four following cases, the history of three in which recovery promised is incomplete.

205. *Abscess in the Liver discharged by the Lung, followed by Convalescence.—Proceeded to England, and died shortly after Arrival.—No Account of the Post Mortem Appearances.*

Robert —, aged fifty-one, lieutenant, of the pension list thirty-two years' service in India, resident in Bombay, a free liver, and the subject of occasional hepatic ailments, was admitted into the General Hospital, on the 23rd June, 1842. He complained of occasional uneasiness of the right side, want of appetite and irregular bowels. On the night of the 4th July, he was seized with a fit of coughing, and ejected about six ounces of frothy puriform looking fluid. He continued till

* Transactions, Medical and Physical Society, No. i., 2nd Series.

the 17th August expectorating puriform matter, at times, of brick-red colour, and occasionally, to the extent of several ounces in the course of the day. After the 17th, the puriform expectoration ceased. There were occasional scanty mucous sputa ejected. He improved in general health; left the hospital on the 6th September, and proceeded to England by sea, but died shortly after his arrival in that country on the 8th February, 1843; under what circumstances is not known.

206. *Hepatic Abscess attributed to Blows.—Opening into the Lung.—Improvement.—Record as to the Issue incomplete.*

Syud Merim, a Mussulman labourer of forty years of age, about two months before his admission into the clinical ward, on the 28th of June, 1850, received several blows on the right side of the chest, in a quarrel. He experienced no inconvenience till a month afterwards, when acute pain came on suddenly in the right hypochondrium, with difficulty of breathing. On admission he was a good deal reduced, the respiration was short and hurried. The ensiform cartilage, the rib margins, and a line drawn from the left tenth rib across the abdomen above the umbilicus formed the boundaries of a full, resistant, and dull space. The dulness extended upwards to the fourth right rib, and there was bulging below the fifth rib. The decubitus was dorsal, the pulse feeble, the bowels regular, and he suffered from evening febrile accessions. On the 23rd June, he expectorated eight ounces of pink-coloured sero puriform fluid, with some relief to the dyspnœa. There was now more or less expectoration daily, with less febrile disturbance. On the 2nd July, the bulging of the right false ribs had nearly disappeared. He continued to improve slowly, but becoming discontented he left the hospital on the 8th July; after which date there is no record of his case. He was treated with anodynes and tonics.

207. *Hepatic Abscess opening through the Lung.—Result of the Case not recorded.*

Luxuman Ragoo, a Hindoo blacksmith, of thirty-five years of age, using about three ounces of spirits daily, was admitted into the clinical ward, on the 22nd February, 1853. There was some degree of fulness of the lower part of the right side of chest, and there was sense of induration, with dulness, for three inches below the right false ribs. The dulness reached

upwards to the fifth rib. There was pain on pressure below the right false ribs, and in the epigastrium. Decubitus easy on all sides. Had occasional short dry cough. Suffered two months before from occasional febrile accessions. These ceased, but about ten days before admission, while engaged in his ordinary avocations, he suddenly felt uneasiness of the right hypochondrium. For six days the bowels had been relaxed. On the 26th he began to expectorate pinkish muco-puriform sputa. This continued sometimes copiously, and on the 1st March all fulness below the margin of the right ribs had ceased, and dullness did not reach above half an inch below them. Subsequently, the cough was still troublesome, but the sputa chiefly consisted of frothy mucus. Throughout this time, there was little constitutional disturbance, and the diarrhœa had ceased. The diary of the case closes abruptly on the 6th March, through carelessness of the clinical clerk, without record of the issue.

208. *Hepatic Abscess communicating with the Lung. (?)*
—*Result not known.*

Isaac Ibrahim, a Mussulman cart-driver, of forty years of age, was admitted into the clinical ward on the 5th November, 1852. He was emaciated. The respiration was short and hurried, and the right side did not move freely. There was complete dullness of the right dorsal and lateral regions, with defective resonance of the scapular, interscapular and mammary, with absence of vocal thrill and respiratory murmur in the two first. There was no induration or dullness below the right ribs, but pain on pressure there. On measurement, the right side of chest exceeded the left by half an inch. He was troubled with cough and expectoration of muco-puriform red-tinged sputa. Bowels relaxed. He said that he had suffered from intermittent fever five months before, which ceased in fifteen days, and was followed by pain in the right hypochondrium, and below the margin of the right ribs, and of the right shoulder. The cough came on about six weeks before admission, that it was mild for the first fifteen days, but then became troublesome, and the sputa tinged red. The dysenteric symptoms had existed for a month. Admitted that he had used spirituous liquors pretty freely. He remained in hospital till the 12th November, when he was removed by his friends. During his stay he experienced evening febrile accessions.

Remark.—The physical signs and symptoms were hardly

adequate to determine the diagnosis of hepatic abscess, communicating with the lung; but, coupled with the history, they were probably sufficient.

The expression frequently made use of, that hepatic abscess has opened into the bronchi, is not correct if it be meant to imply that the communication has taken place *directly* between the abscess and a bronchial tube of large size. In fatal cases it will be found generally that adhesions have formed between the diaphragm and the concave base of the right lung on the one side, and the convex surface of the liver on the other, and that a ragged excavation exists in the lower part of the lung, which communicates with the abscess in the liver. Occasionally, communication with the sac of the pleura is observed, as well as with the lung; and sometimes the communication is only with the pleura, and leads to empyema.

The following cases (209. to 218.) are narrated in illustration of these remarks:—

209. *Dysentery. — Secondary Hepatic Abscess forming obscurely. — Opening into the Lung. — No Ulceration of the Intestine.*

Rustom Khan, a worker in tin, a Mussulman, of thirty-five years of age, reduced in flesh, not using spirits, was, after twelve days' illness, admitted into the clinical ward on the 21st December, 1851. He suffered from dysenteric symptoms, was free of abdominal fulness or induration, and of febrile excitement. After the 29th he suffered from occasional accessions of fever, commencing with chills and terminating with sweating. The dysenteric symptoms continued, but in decreasing degree; and on the 29th January he complained of pain of the right shoulder for the first time, and on the 30th of pain below the margin of the right ribs, on full inspiration; but there was no dulness on percussion there. The right side of the chest, from the nipple to the margin of the ribs, seemed somewhat fuller, but dulness did not reach above the fifth rib. The right

side of abdomen was more resistant than the left, and the respiration was short and hurried. The pain of shoulder and side continued, and on the fifth February there was dulness and induration for half an inch below the ribs. On the 8th there was troublesome cough, and extension of the dulness an inch below the ribs. The febrile accessions had become less, and the dysenteric symptoms were almost gone. On the 18th the right side, at the nipple, measured an inch more than the left. On the 23rd five ounces of pinkish puriform sputa were expectorated; this continued more or less with recurrence of dysentery from time to time till the 19th April, when he died. The urine was frequently tested, but gave no signs of albumen.

Inspection twenty hours after death.—*Abdomen.* The cavity of the abdomen contained a pint of limpid serous fluid.—On removing the liver, which was much enlarged, with the right lung, the inferior lobe of which was firmly adherent to the diaphragm, a large abscess, the size of an ostrich egg, and containing about a pint and a half of healthy pus, was found in the substance of the right lobe. Its walls were lined by a thin fibrous membrane, and were formed inferiorly and on the left side by the parenchyma of the liver, on the right superiorly by the diaphragm. But at the right edge of the superior wall, for the space of about two and a-half inches in circumference, the diaphragm was absorbed and destroyed, and the pus was in contact with the substance of the inferior lobe of the right lung, which was also absorbed and excavated to a slight extent. This excavated surface was red, soft, and irregular, and not lined by any fibrous membrane. No bronchial tube of size could be discovered opening into the abscess sac. The left lobe of the liver was healthy.—Both kidneys were pale, but healthy. The cortical portion of both was distinct from the tubular.—The mucous lining of the large intestine presented here and there patches of redness of different sizes; otherwise it, as well as the other coats, were healthy. Peyer's glands, solitary and agminated at the end of the ileum, were slightly enlarged, but no ulceration was found anywhere. The coats of the small intestine were thin and pale. The other viscera were healthy.—*Chest.* Both cavities of the chest contained about a pint of clear serous fluid. Left lung was soft and crepitating; its structure was healthy. The two upper lobes of the right lung were soft and crepitating; the inferior lobe was adherent to the posterior parietes of the chest, the pericardium and the diaphragm by firm adhesions; its upper half was healthy, but the lower half was red and dense. The incised surfaces were also

red and soft, yielding readily to the pressure of the finger, and giving out frothy red serous fluid. The inferior surface of the lobe was closely adherent to the diaphragm, and at one spot its substance, as already stated, was removed by absorption, and excavated to a slight extent by the extension of the abscess of the liver in an upward direction.

210. *Large Hepatic Abscess with Brick-red Pus.—Smaller one opening into Lung.—Brick-red Sputa.—No Diarrhoea till just before Death.—Intestines not examined.—A Spirit Drinker.*

Kalloo, a Mussulman sailor, a native of Calcutta, twenty-six years of age, and in reduced condition, was admitted, after twenty days' illness attributed to excessive spirit-drinking, into the clinical ward on the 18th April, 1849. The respiration was thoracic, and more with the left than the right side. There was dulness on percussion of the right side of chest, from the fourth rib downwards to the margin. The abdomen was generally soft, with exception of induration without prominence, for two and a half inches below the right ribs, tender on pressure, and with pain augmented by cough and full inspiration. There was cough and febrile heat, and frequent small pulse; but the tongue was moist and nearly clean. He stated that his illness commenced with fever, ushered in with chills, and that after seven days it was accompanied with pain of right hypochondriac region, and that an evening exacerbation of fever became marked, and sometimes issued in sweating. He was nineteen days under treatment. Cough, with more or less pain of right side, and fever with night exacerbations, sometimes followed by sweating, persisted. On the 23rd there was crepitus anteriorly above the third right rib, and below it, dulness and absence of breath sounds. After the 27th the sputa became more or less mucous, with brick-red tinge, and sometimes copious. The urine, generally free, ranged from 1,004 to 1,016 in density and showed no trace of albumen. No diarrhoea till three days before his death, on the 7th May. He was treated with anodynes, quinine, and mineral acids, and a small blister was applied above the right nipple when the crepitus was detected; sponging the side with nitro-muriatic lotion having been previously used.

Inspection seven hours after death.—Abdomen. A large abscess containing upwards of two pints of reddish coloured thick pus, occupied the external part of the right lobe of the liver; it pro-

jected from the under concave surface in the direction of the colon, and the liver adhered firmly to the lateral abdominal parietes and to the diaphragm, and these formed the external lateral wall of the abscess. Another small abscess of the size of a hen's egg, occupied the upper convex surface of the right lobe, separated from the upper wall of the large abscess by a layer of the substance of the liver compressed, and about an inch in thickness. This small abscess opened through the diaphragm, by a large opening with rounded edges, into an abscess sac, the size of an orange, formed in the third lobe of the right lung towards its base. At the anterior and lateral part of this abscess, about the level of the fifth and sixth ribs, there was a gangrenous opening into the sac of the pleura, which was filled with grey serous and fetid pus; and the pleura, in contact with the effusion, had a greyish gangrenish look, and was covered with flakes of friable lymph. The upper and middle lobes of the right lung were compressed against the mediastinum by this effusion. In the right kidney there was commencement of Bright's disease; both, when divested of their capsules, presented a red and yellow mottled appearance.

211. *Hepatic Abscess opening through the Lung.—Causing Pleuritis and Effusion.—Also presenting externally, but not opened.*

Goohee —, a Mussulman sailor of stout frame, a native of Calcutta, thirty-eight years of age, and for twenty years engaged in voyages to all parts of the world, and habitually using spirits freely, was after a month's illness admitted into the clinical ward on the 6th August, 1850. The respiration was short and hurried, and the lower part of the right side of chest moved imperfectly. There was not any abnormal chest dulness; occasional crepitus was audible in the lower part of right mammary region. The abdomen was full, resistant below the margin of the right ribs with dulness, but no distinct induration, for three inches below the ribs. He had dull pain of the right hypochondrium, increased by full inspiration and pressure below the ribs, occasional cough, with frothy mucous sputa. The bowels were rather slow. Complained of morning and evening chills, but not of febrile heat. The tongue was moist and almost clean. While at sea was attacked with fever, followed in three days with acute pain of right side. The fever, he said, left him, but the pain persisted. He attributed his illness to exposure to wet. After admission, evening febrile accessions, with

night sweats were noticed, and the bowels began to be relaxed. On the 29th August there was indistinct fluctuation between the seventh and eighth right ribs, an inch and a-half external to a vertical line dropped from the nipple. The fluctuating point became more distinct and prominent, and there was general bulging of the lower right chest. The cough had persisted with mucous sputa, but on the 26th September the sputa became more copious, pinkish, and muco-puriform. On the 27th eighteen ounces were expectorated. The fulness and tenseness of the side and the fluctuation disappeared, and the hectic lessened. From this to 10th October there was relation between the amount of the sputa, and the uneasiness and tenseness of the side, and the absence or presence of fluctuation. On the 10th October severe pain of the right side of chest was complained of, and on the 14th the right side did not move at all in respiration. The relaxation of the bowels, more or less present during his residence in hospital, increased. Exhaustion and dyspnœa increased, and he died on 20th October.

The treatment previous to the 29th August consisted in the application of small blisters to the right side, the use of quinine, combined with ipecacuanha and opium, and occasionally blue pill. Afterwards anodynes, tonics, and stimulants, with suitable nourishment, were the means used.

Inspection twelve hours after death.—*Chest.* On removing the sternum a fluctuating sac was seen to the right of the mediastinum formed of partially organized lymph. It was somewhat pyriform in shape, and in contact anteriorly with the ribs and their cartilages, and posteriorly with the anterior surface of the third lobe of the right lung, resting inferiorly upon the diaphragm which was here normal in structure. On laying open the sac a large quantity of limpid serous fluid was found mixed with flakes of fibrine. It was further divided into two or three sacculi by bands of friable lymph. When traced upwards, it was found to be separated by a layer of lymph from another large sac from which on being opened, a few bubbles of gas escaped. This second sac contained a large collection of fluid (about a pint) sero-purulent in character; it involved almost the whole of the right pleura, compressed the two upper lobes of the lung against the mediastinum, and passed behind the third lobe, as far as the diaphragm,—being, however, separated from the lateral, anterior, and inferior surfaces of this lobe in consequence of the firm connexions which these parts of the lobe had formed with the costal pleura and diaphragm. On cutting into the third lobe, a ragged and irregular cavity was

seen, which, laterally, approached very nearly to the surface, and was torn open on the lung being separated from its adhesions to the costal pleura, and which had probably there communicated with the sac of the pleura, and led to the large pleuritic effusion. Inferiorly this cavity communicated through the diaphragm with a distinctly circumscribed excavation, about the size of a large orange, which occupied the upper and lateral parts of the substance of the right lobe of the liver, was lined by a slightly irregular membrane, and extended from the sixth to the tenth rib. The abscess in the liver communicated externally, at the most prominent part of the swelling, noticed in the side during the lifetime of the patient, through the intercostal space between the seventh and eighth ribs. The intercostal muscles were in this situation in a soft and sloughy state, and the contents of the abscess were effused into the surrounding areolar tissue for the distance of an inch around. The excavation in the liver contained a few ounces of sero-sanguineous pus, similar in character to the matter expectorated. In other respects, the liver was normal, both in size and structure; it projected about two inches below the right false ribs. The left lung was healthy and free from adhesions. The intestines were discoloured externally, but were not examined internally. The kidneys were healthy. The heart was not examined.

212. *Hepatic Abscess opening into the Lung.—Death.*

Fyzulshaw, a Mussulman beggar, emaciated and suffering from illness three months before his admission into the clinical ward on the 6th April, 1852. The right mammary, lateral and dorsal regions were dull on percussion, and bronchial respiration and crepitus were audible. He was troubled with cough and expectorated deep red, partly mucous, partly puriform sputa. He attributed his illness to his having been beaten on the right side. He became gradually weaker, the physical signs, with addition of cavernous respiration in the right dorsal region, continued. The sputa lessened in quantity, but remained unchanged in colour. He died on the 14th June.

The body was examined by Dr. Watson fourteen hours after death.

The heart, the whole of the left lung, and the upper part of the right were healthy, and in the abdomen, the intestines, spleen, and kidneys were normal.

The right lobe of the liver adhered firmly to the adjoining

surface of the diaphragm, and the base of the right lung adhered firmly to the corresponding convex surface of the diaphragm and to the adjacent costal pleura. The adhesions were very firm, and the several parts closely united. An abscess containing about two ounces of pus, of oblong shape, the size of the segment of a hen's egg, was situated superficially in the liver opposite to the ninth and tenth ribs with thick firm lymph interposed. The adjoining texture of the liver was dense and hard, for about the depth of a quarter of an inch. The contents of the abscess were partly fluid, and looked like cream mixed with a little blood. The interior of the surface of the sac was covered with long soft flocculi, but no granulations of any sort were detected. From the abscess a small ragged opening passed through the diaphragm into the lung. The adjoining portions of the lung were soft and friable, and at one place about half an inch to the left of the opening, an ill-defined abscess about the size of a small walnut was found. This communicated with a large bronchial tube, which as well as the surrounding tissue contained some bloody matter.

213. *Abscess of the Liver discharging through the Lung.*

Thomas Rich, aged twenty-two, seaman, Honourable Company's Receiving ship "Hastings," after five months' illness from fever, followed by bowel complaint, pain of the right side, attended latterly with short cough and scanty expectoration, was admitted into the General Hospital on the 22nd March, 1842. He was emaciated. The abdomen was moderately distended but without distinct enlargement of either the spleen or the liver. The bowels were relaxed, the skin above natural temperature, the pulse was frequent and feeble, the tongue florid, cough troublesome, and the feet œdematous. On the 24th the dejections were reported of pale colour and yeasty appearance. On the evening of the 28th, the cough was for the first time accompanied with purulent sputa in considerable quantity. Under the influence of the cough with purulent expectoration and diarrhœa, he gradually lost ground, and died on the 1st May.

Inspection fifteen hours after death.—*Abdomen.* The liver was considerably enlarged, and the upper part of the right lobe was occupied by a large abscess with serous and puriform contents. The convex surface of the liver adhered to the diaphragm by old adhesions, as did the base of the right lung to the upper surface of the diaphragm; and at the site of the adhesions the

abscess communicated with the lung. The stomach and intestines were attenuated. The thoracic viscera were otherwise healthy.

214. *Hepatitis, ending in Abscess discharged through the Lung. — An Abscess in the third Lobe of the Right Lung, communicating freely through the Diaphragm with the Abscess in the Liver. — Mucous Coat of the Large Intestine ulcerated. — Many of the Ulcers cicatrized.*

John Shea, aged twenty-eight, was admitted into hospital on the 22nd November, 1840, in a moribund state, and died eight hours after admission. He had been sent from the sloop "Clive" off Aden, and had been first taken ill with hepatitis on the 6th August; had improved, but the disease recurred severely on the 23rd of the same month. There had been severe pain increased by decubitus on the left side, and by pressing the liver against the diaphragm. He had been bled, &c. On the 6th October, he was suddenly seized with expectoration of purulent matter, which continued with diarrhœa till the period of his death.

Inspection twelve hours after death. — Head. Nothing worthy of note. — *Chest.* Neither lung collapsed. The posterior part of the left one was very œdematous, the anterior emphysematous with a few tubercles disseminated. The right lung adhered to the costal pleura by tender lymph, and to the diaphragm by similar adhesions; there were a few tubercles in the upper lobe. The rest of the lung was very œdematous, but chiefly the third lobe, which was also in parts hepatized. At the anterior part of the base (the part opposed to the diaphragm) of the third lobe, there was an abscess the size of an orange, with an inner surface very ragged and flocculent when floated in water. This excavation communicated through the diaphragm with an abscess in the upper surface of the right lobe of the liver, about the size of a small orange, superficial, and lined with a firm membrane with irregular flocculent surface. The rest of the liver was healthy, and not mottled. On the surface of the heart there were many white pearly spots; but the organ was sound. — *Abdomen.* There were a few ounces of serum in the cavity. The stomach, much distended, occupied the whole space between the umbilicus and ribs; its mucous coat was pale and sound in texture. The colon was covered by the stomach, was contracted, and had

formed no unnatural adhesions. The mucous coat was reddened in parts, and there were a few small circular ulcers, with the cicatrices of many others, chiefly distinguished by their dark grey colour and a level rather below that of the rest of the surface, and not moving so freely over the subjacent tunics as the rest of the mucous coat. The edges of a few of these ulcers were puckered, but those of the greater number were rounded, and not thickened. The kidneys and spleen were healthy.

215. *Two Hepatic Abscesses.—One opening into the Lung, with Expectoration of deep Bile-tinged Puriform Sputa.*

An Indo-Portuguese, of twenty-six years of age, was admitted into the Jamsetjee Jejeebhoy Hospital, on the 8th January, 1848, ill with symptoms of hepatitis, for six weeks. He stated, that three days before admission, he began to expectorate sputa of bloody appearance and intensely bitter taste. After admission, the sputa were of laudable pus; but on the 9th they became of deep yellow colour, thick and glairy, easily expectorated, and in great quantity, and the swelling of the right side, much less than on admission, extended downwards to a line drawn transversely from umbilicus, and to the mesial line. The parietes of abdomen were much bulged out, and pain was felt to the right of the epigastrium under the cartilages of the false ribs. He said that it had before extended over great part of the right side of the chest. Dejections whitish. Died rather suddenly on the night of the 17th.

Inspection.—Abdomen. Opaque pinkish or chocolate-coloured fluid, with flocculi of lymph, was found in great abundance in the abdomen. The peritoneum of paries and viscera was of red colour. A large abscess of left lobe of liver pressed on the stomach, the sac at its upper part having the substance of the liver extended over it, but this gradually thinned away, and at the lower part the wall was formed of the thickened peritoneal covering. Another large abscess occupied the lower part of the right lobe of the liver. Both these abscesses contained pus, very slightly tinted, of a greenish yellow; that in the abscess of the left lobe was more abundant and thinner; both had ragged walls. There were adhesions to the stomach and duodenum. The capsule of Glisson was thickened. The gall-bladder contained only a little viscid mucus of a greenish colour. At the upper part of right lobe there was adhesion to the diaphragm, and corresponding thereto the right lung was also adherent. On separating the adhesion of the lung, a cavity was opened which extended into a small abscess in the liver with

thick firm lining as of adventitious membrane. The neighbouring portion of the liver was much gorged with blood, and the cavity extended upwards into the lower part of the lung; its walls there being very ragged and uneven, and the surrounding portion of the lung was hepatized and gorged with blood. The portion of this common abscess which was in the liver contained only thick whitish pus; while that which was in the lung contained pus of deep yellow or greenish yellow, and its ragged walls were deeply stained of the same colour, and on pressing the abscess before opening it, deep yellow fluid was made to flow upwards through the divided bronchial tubes.

Remark.—Dr. Leith was present with me at the inspection of this case. To him I am indebted for the note of the appearances observed, and for the information that he had not long before witnessed a somewhat similar case of bile-tinged sputa in the hospital of the Bombay police corps.

216. *Abscess of the Liver opening into the Lung, and forming a circumscribed Sac there.—General Peritonitis for Four Days before Death.*

Thomas Dean, aged twenty-two, had led a sea life for eight years, chiefly in voyages to India, and had served for eight months in the Indian Navy, with good health, till November, 1838, when, it was stated that, during the voyage from Bombay to Suez, he suffered from symptoms of hepatitis. From these he was slowly recovering, when consequent on exposure to the colder weather of Suez, he experienced considerable aggravation of his former symptoms, accompanied with severe cough and pain of the right side. He was cupped and blistered, used blue pill and ipecacuanha, and subsequently diluted nitric acid, and counter-irritation with tartar emetic ointment. On his return to Bombay, he was admitted into the European General Hospital on the 19th January, 1839. He was pale but not emaciated. Suffered from night sweats, and frequent cough with copious expectoration of *brick-red* puriform sputa. The following *physical* signs were noted on his admission:—"On the right side under the clavicle the sound is not dull on percussion, but is so laterally to the level of the fourth rib. The murmur is very obscure all over the right side of the chest, and there is strong resonance of the voice under the clavicle, but not above the spine of the scapula. On the left side anteriorly the murmur is unmixed, it is somewhat blowing under the clavicle and very obscure posteriorly; no resonance of the voice

under the left clavicle." The dull sound on percussion subsequently extended to the axilla of the right side. The sputa continued copious. The pulse was generally 100 or upwards. Tongue clean and moist. Pain of the right side was sometimes complained of, and the position, in which he suffered least, was resting on the left side, and bending forwards. The bowels were sometimes relaxed. In this state he continued under the use of blisters, tonics, anodynes, laxatives, &c. till the 2nd April, when there was increase of pain of the right side, which on the 8th, extended over the abdomen, was increased by pressure and by lying down, so that he was obliged to continue in a sitting posture. Pulse frequent and feeble. Large opiates were given. On the 9th the symptoms continued unabated, and the abdomen was somewhat distended. The opiates were continued, and turpentine stupes applied to the abdomen. On the 10th, 11th, and 12th, the abdomen continued distended, there was less pain complained of, the pulse became feeble, the countenance more collapsed, and the cough and expectoration decreased. On the evening of the 12th, whilst sitting in his usual posture, complaining more of pain, he fell backwards with laboured breathing, and died after about ten minutes.

Inspection fifteen hours after death.—The chest narrow, and abdomen full.—*Head.* The substance of the brain was exsanguine, and there was about an ounce and a half of serum in the cavity of the skull.—*Abdomen.* There was about half a pint of serum, with flakes of lymph floating in it, in the pelvis. Many of the convolutions of the small intestine adhered to each other, by flakes of lymph; *some convolutions of the ileum (thus united) passed over the hepatic flexure of the colon and were interposed between the liver and the ribs.* The liver was generally free of adhesions except at one place to the diaphragm, where there was a superficial abscess which had discharged itself into the right sac of the pleura.—*Chest.* The lungs were emphysematous and white. The lowest lobe of the right lung adhered to the diaphragm and to the costal pleura at the posterior part, and was in part converted into a sac filled with purulent matter. The liver reached to the third rib, and the contents of the abscess of the liver seemed to have been discharged into the pleura, been there circumscribed by adhesions, and thence discharged through the lung. The left lung was healthy. The other viscera were not examined.

217. *Abscess in the Liver opening through the Diaphragm into the Sac of the Pleura, and causing Purulent Effusion there.*

James Oakhum, aged thirty-two, a feeble man of reduced and emaciated habit, was admitted into the European General Hospital on the 27th September, 1843. He stated that he had been under treatment for eight days, suffering from pain of the right side, first under the clavicle, subsequently at the margin of the right ribs; and that he had been leeches and blistered. On admission, the skin was hot and dry, and the tongue florid at the tip. On the 28th he complained of pain at the margin of the right ribs, impeding full inspiration, and the febrile symptoms continued. A few leeches were applied with relief. On the 29th it is thus reported:—

“Percussion anteriorly on both sides good, and the respiratory murmur is heard. On the right side laterally and posteriorly there is perfect dulness on percussion, and the respiratory murmur is inaudible. On the left side there is no dulness on percussion, and the murmur is audible.”

The symptoms varied little, there being febrile disturbance generally present with a marked evening exacerbation, associated with occasional diarrhoea, and seldom any complaint of pain of the side till the 3rd October, when he began to be troubled with cough which was accompanied on the 4th with expectoration of thin puriform fluid. The cough, the puriform expectoration, the dulness on percussion of the right side, the febrile symptoms, the occasional diarrhoea continued accompanied with progressive emaciation, and collapse, and latterly short and oppressed breathing, till the morning of the 12th October, when he died.

Inspection eleven hours after death.—The body was much emaciated.—*Chest.* On the right side, from the fourth rib downwards, anteriorly, the lung adhered to the costal pleura, and also to the diaphragm, but there was no adhesion of the posterior part of the lung. At the posterior part of the right side of the chest and also the anterior above the level of the fourth rib, there were about two pints of faint reddish coloured puriform fluid. This purulent effusion communicated through the diaphragm behind the lung, with an abscess in the upper and posterior part of the right lobe of the liver, in size considerably larger than the closed fist. The lung was compressed but healthy in texture. The left lung was healthy. The abdo-

minal viscera were not particularly examined, but the intestines were healthy externally.

I have met with cases in which the symptoms of hepatic abscess had been well marked, and the occurrence of puriform expectoration suggested the diagnosis that communication had taken place between the abscess and the lung, and yet examination after death failed to verify the fact. I quote three cases of this nature (218. to 220.). In the two first communication was carefully looked for, but not found; and the condition of the lung was not such as to account for the character of the sputa. In the third there is a doubt thrown over the sufficiency of the examination, and the base of the right lung was hepatized. I do not wish to draw a positive inference from these cases, but they justify the question, whether, when interstitial absorption is going on in the abscess wall between the liver and the lung, and the tissues are becoming soft and succulent, part of the contents of the abscess may not pass through by imbibition before the occurrence of actual rupture. At all events, this is a question for future inquiry to solve.

218. *Abscess in the Liver.—Puriform Expectoration, but no distinct Communication with the Lung detected.—Ulceration of Large Intestine.*

John Ryan, aged twenty-five, a Private of the 4th Light Dragoons, five years resident in India, and never affected with fever, hepatitis, or dysentery, was, after two days' illness with febrile symptoms, admitted into hospital at Kirkee on the 18th May, 1832. He complained of pain of the right hypochondrium, acute, and extending to the right shoulder, aggravated by motion and decubitus on the left side, and attended with febrile disturbance. These symptoms, more or less continued, were present throughout the month of June, with, towards the end of that month, distinct enlargement of the liver, hectic fever, cough, with

expectoration of reddish brown sputa. This state continued in July with increase of the red-tinged puriform expectoration, absent when decubitus was on the left side, but troublesome when on the back; and with accession of dysenteric symptoms. He died on the 27th July. The treatment had consisted of bloodletting, leeches, blisters, tartar-emetic ointment, mercurials, nitric acid, ipecacuanha, and gentian; ptyalism had not been freely induced.

Inspection seven hours after death.—The liver, much enlarged, extended on the right side as low as the last false rib, and in its passage across the abdomen projected considerably beyond the cartilages. It was bound closely to the right side, and a great portion of the right lobe adhered firmly to the diaphragm. The concavity of the liver adhered pretty firmly to the colon. Part of the thin edge of the right lobe was covered by an adhesion of the omentum. In the right lobe were three distinct abscesses, lined by membrane with irregular surface. That abscess which approached nearest to the surface occupied the right side of the lower portion of the right lobe; between it and the colon there was only a thin layer of the substance of the liver, which, with the colon, formed part of the wall. The two other abscesses approached near to the diaphragm. The third lobe of the right lung adhered firmly to the diaphragm; so much so, that in one part, in endeavouring to separate the adhesions, part of the upper wall of one of the abscesses came away; it might be said to have been formed of the diaphragm, in such close adhesion with the upper surface of the liver, and lower surface of the lung, that there was no possibility of distinguishing the difference of structure. No communication with the lung was discovered. Pus thick, consistent. The left lobe did not contain any abscess; it was much indurated, but not changed in colour. The omentum vascular, extended into the cavity of the pelvis, and adhered slightly to some of the viscera. The cœcum, thickened, adhered to the iliac fossa. The transverse colon had not lost its cellular character, but was somewhat changed in direction. The mucous lining of the ileum was healthy; that of the cœcum, with its sub-cellular tissue much thickened, in parts cartilaginous, and ulcers of considerable size, unattended with redness, occupied the thicker and more indurated parts. The bottom of some of the ulcers was formed only by the peritoneum. Throughout the colon there was thickening, probably in the intercellular tissue, but not to so great an amount as in the cœcum; no ulceration, but the mucous coat was pulpy, had an irregular, mammillated surface, and looked more like a coat of thick transparent mucus, in parts removed, than an

organized membrane. The mucous tunic with its thickened cellular tissue could be easily raised from the muscular coat and peeled off in large portions. The muscular fibres were normal. The stomach was healthy. The lower lobe of the right lung was somewhat gorged, and when cut into and pressed, gave out frothy yellow, thin, purulent-looking fluid. The bronchial lining was slightly reddened. In other respects, with the exception of a calcareous concretion near the right bronchus, the lungs were healthy. With the exception of the adhesions to the diaphragm, there were hardly any others. The heart was healthy.

219. *Abscess in the Liver slowly formed.—Puriform Expectoration.—Communication between the Abscess and the Lung not detected.*

Robert Carreth, aged twenty-five, seaman, ship "Advocate," was admitted into the European General Hospital on the 22nd February, 1843, after having suffered for some time from symptoms of hepatitis. He continued till the 1st of April, complaining occasionally of pain of the right hypochondrium, never to any great degree, and there was no perceptible fulness. He was pale and becoming gradually reduced in strength. On the 1st of April, there was added occasional vomiting with increased pain at the margin of the ribs and diarrhœa; but as yet no evening febrile accessions. On the 13th April, there was a good deal of tenseness at the margin of the right ribs but no marked fulness, he continued to lose flesh and was affected with occasional night sweats. The pain was at times complained of, but was never acute. On the 25th, slight fulness towards the epigastrium and below the ribs of the right side was first noted. The tongue became florid, and febrile symptoms were at times present. In this state he continued, still becoming more emaciated, till the 1st June, when he was seized with cough and dyspnœa, and expectorated a considerable quantity of purulent matter of brick-red tinge. Suffering from cough, dyspnœa, and purulent expectoration, he lingered till the 18th June, when he died. The treatment consisted of very moderate leeching once or twice, the occasional application of sinapisms, the exhibition of camphor and quinine, and anodynes.

Inspection eight hours after death.—The liver adhered firmly to the diaphragm and to the right side. There was a large abscess in the right lobe, the cavity capable of containing a large ostrich egg, it was filled with thick pus, and the sac had flocculent walls. A thin layer of condensed substance of liver

formed the external walls. The lower part of the right lung was hepatized. No distinct communication between the abscess and lung was discovered, but the wall between was readily lacerable, and the examination with the view of detecting a communication was not minute. There was lymph effused here and there on the surface of the intestines.

220. *Frequent Attacks of Ague in a Man of very dissipated Habits.—Hepatitis ending in Abscess.—Circumscribed Empyema. — Puriform Expectorations, but no traceable Communication with either Purulent Deposit and the Lung.*

Charles Goodson, seaman, Honourable Company's steamer "Sesostriis," aged thirty-two, of very dissipated habits. After having suffered from several attacks of hepatitis was placed on the sick list on the 22nd January, 1843, ill with remittent fever. On the 30th he began to complain of pain of the right hypochondrium, attended with hard cough and irritability of stomach. He was slightly brought under the influence of mercury, and while suffering from irregular febrile accessions, cough and weakness, he was sent to the European General Hospital, on the 1st of March, 1843. Till the 16th he suffered chiefly from the accessions of fever, when he complained of increased pain of the right hypochondrium stretching to the shoulder attended with short hacking cough and sallow countenance. On the 27th, he expectorated a considerable quantity of puriform matter. He continued harassed with the cough, expectorating pus, at times copiously, and tinged with blood; and died on the 17th May.

Inspection six hours after death. — Chest. The costal and pulmonary pleura of the right side were coated with a thin layer of old lymph, and about three pints of fetid pus were contained in the sac of the pleura, chiefly above the third lobe of the lung (*i. e.* having that lobe interposed between the diaphragm and the effusion). The lung was crepitating and very little condensed, and there was not any communication between the effusion and the lung. The third lobe adhered by its base firmly to the diaphragm; on the opposed side of that muscle, the liver adhered firmly and closely, and there in the substance of the liver, and close to the diaphragm was a large abscess, containing upwards of a pint of thick pus, having firm walls, but no distinct communication with the lung. The third lobe

of the right lung was somewhat infiltrated with sero-purulent fluid, but it crepitated. The liver was dark coloured, and considerably enlarged, but without any other abscess.

Hepatic Abscess opening into the Stomach or Intestine. — Very few instances of this occurrence have come under my notice. There are before me the notes of 124 cases of hepatic abscess; and these by no means record the full amount of my experience in this disease. Yet I do not find more than three cases that can be classed under this head. In one the situation and marked decrease of the swelling suggested the belief that the abscess had opened into the stomach, but no vomiting occurred, nor was pus observed in the alvine discharges; yet, after death, the diagnosis was proved to be correct, for communication existed between the abscess and the stomach. In this case the pus must have slowly oozed into the stomach, and thence passed in small quantity at a time through the intestinal canal, probably in an altered form. In the second the situation of the swelling and the symptoms suggested the opinion that the abscess had opened into the colon, but pus was never observed in the alvine discharges; recovery took place. In the third case communication with the colon was found after death, but the information relative to the symptoms during life had been incomplete.

There is, I apprehend, a very general impression, that the opening of hepatic abscess into the alimentary canal is not rare; that it is well marked by the sensations of the patient and by purulent vomiting or dejection; and that it is a favourable course for the abscess to take.

These opinions are not, however, in accordance with my personal experience. I have already shown that, in the few cases which have come before me, the pus must

have drained so slowly into the canal as not to affect the appearance of the discharges, though its presence had been carefully looked for.

Though I have no practical acquaintance with abscess rupture into the alimentary canal, and copious purulent discharge, and though we may not question the accuracy of the contrary observations of others, yet I am satisfied that on this point there has been a good deal of loose observation and of vague record; and that too much weight has been generally accorded to the report of the patient. I hold this opinion because, in two or three instances in which the occurrence of this event has been stated to me by others, the evidence upon which the belief was entertained has failed to convince me.

The following are the three cases (221. to 223.) to which I have adverted.

221. *Abscess in the Left Lobe of the Liver opening into the Stomach.—No Vomiting.—No Detection of Pus in the Intestinal Discharges.—No Intestinal Ulceration.*

Ibrahim Mahomed, a Mussulman water-carrier, of thirty years of age, using spirits and at one time opium, habitually; was admitted into the clinical ward on the 30th June, 1853. He was emaciated, countenance anxious, pulse small. In the epigastric region there was a swelling, the size of a cocoa nut, prominent, soft, indistinctly fluctuating; the skin covering it sound in texture, not pointing, but somewhat tense. The swelling was painful and tender; a line drawn from the point of the ninth right to the ninth left rib, and curving with its lowest point an inch from the umbilicus, formed its lower limit. Above, it passed under the ensiform cartilage, and the upper false ribs of both sides. The dulness was continuous upwards on the right with the hepatic dulness, but on the left was separated from that of the spleen, by a resonant interspace. Decubitus on the back or either side. Three months before, a small swelling appeared in the situation of the present large one and gradually increased; it was not very painful and not attended with fever; but he had suffered from fever before the swelling

was noticed; then, however, there was no pain in the region of the liver. His bowels had been regular, and there had not been any vomiting. Suffered from Guinea worm four months ago. On the 3rd July the size and prominence of the swelling were less, the bowels had been four times opened, and the discharges were reported to be dark coloured. From the 4th to the 15th there was no recurrence of diarrhœa, the evacuations were feculent, and still the swelling lessened. Its prominence was gone on the 12th, and the lower line boundary was now from the eighth rib of one side to that of the other. On the 16th again diarrhœa, with discharges described as thin, feculent, and of buff yellow. The swelling was now gone, and the dulness did not extend more than two inches below the ensiform cartilage. There had been no vomiting. From this time there were occasional dysenteric symptoms, occasional slight febrile accessions, and a failing pulse; then on the 2nd August copious intestinal discharges, and death on the 4th. Treated with anodynes and tonics. The urine gave no traces of albumen.

Inspection twelve hours after death. — *Chest.* The anterior surface of the lungs was pale, spongy, and somewhat emphysematous at the edges. No adhesions. — *Heart.* The walls of the left ventricle were thickened and the cavity small. — *Abdomen.* The external surface of the liver was of dark red colour. The liver extended to about two inches below the ensiform cartilage, and about two and a half inches below the margins of the right false ribs. There were not any adhesions between it and the diaphragm, but the concave surface of the left lobe adhered firmly to the smaller curvature of the stomach, and to the pancreas. On separating the adhesions to the pancreas an opening about the size of a rupee with dark grey edges, was apparent in the liver. The opening conducted into an empty sac about the size of a large orange, situated in the inferior surface of the left lobe. This sac was lined by a firm membranous layer, with irregular surface, it also communicated, by an opening sufficiently large to admit an ordinary blow-pipe, with the stomach close to its pyloric end. The substance of the liver for about half an inch beyond the upper wall of the sac was of dark grey colour, indurated and condensed. The inferior wall of the sac was about a quarter of an inch thick, partly fibrous and partly condensed substance of the liver. The substance of the right lobe of the liver was healthy. — *Stomach.* Much distended, and containing about a pint and a half of light-coloured yellow turbid fluid, with white floating flakes, which, examined under the microscope, showed no pus globules. — *Intestines.* In general, pale,

except at the end of the ileum and rectum; in both these situations a blush of redness was seen, and the membrane was softer than natural.—*Kidneys.* Right one healthy, left somewhat lobulated, and of pale buff colour, externally. When cut the cortical substance was also found of pale buff colour; was increased in quantity, and encroached considerably on the tubular portion, which in places was very indistinct.

222. *Hepatic Abscess, recovered from, by probable Opening into the Colon.*

Mahomed Jaffer, a Mussulman, of forty-five years of age, following the trade of painter, using spirits occasionally, and the subject, a year before the date of the present case, of hepatic symptoms, was admitted into the clinical ward on the 5th December, 1853. He was reduced, the countenance was anxious, skin hot, pulse frequent, small and sinking. The respiration was somewhat hurried. Below the margin of the right ribs and the ensiform cartilage, there was sense of resistance, tenderness on pressure, and dulness on percussion, bounded below by a line drawn from the eighth left rib, curving to about half an inch above the umbilicus, and extending to the eighth rib on the right side. Decubitus easiest on the back and right side. The tenderness on pressure was considerable; fever and tenderness of abdomen had come on simultaneously twenty days before admission. The fever was remittent in type, with mid-day exacerbation and evening remission; had cough, with frothy expectoration. The febrile accessions, the epigastric tenderness, with addition of some degree of prominence, continued; and on the 13th December there was indistinct fluctuation. Now there was abatement of fever, but the cough was troublesome, the sputa frothy and mucous. On the 24th, while turning in bed, he experienced a peculiar sensation in the swelling, as if something had given away, and on examination it was found to be considerably diminished. No diarrhoea, no trace of pus in the evacuations. There was now gradual slow decrease of the swelling, with occasional febrile recurrences, and he was discharged on the 15th February, 1854, with a small induration perceptible an inch and a half above the umbilicus, not painful, but with dulness, continuous upwards with that of the liver. He was treated chiefly with quinine and anodynes, then dilute nitric acid, and occasional laxatives, and warm-water application to the epigastrium.

223. *An Abscess of the Liver communicating with the Colon.—Others in process of Repair by Absorption.*

An old man was admitted into the Jamsetjee Jejeebhoy Hospital with fulness below the margin of the right ribs, indicating the existence of hepatic abscess. Before death the fulness had lessened considerably, but how caused was not understood. Towards the thin edge of the right lobe of the liver there was an abscess the size of an orange, having the concave surface adherent to the right kidney, for its lower wall. It communicated, by an opening the size of a goose quill, with the hepatic flexure of the colon. The mucous membrane around the opening was free of disease. The walls of the abscess were almost cartilaginous in density. The substance of the liver was very firm, and here and there were yellow dense circumscribed deposits the size of a horse-bean and upwards in size; they were tubercular-looking in appearance, and in one, the size of a walnut, the contents were soft and putty-like. The contents of both were examined under the microscope. The dense, tubercular-like contents consisted of small granules. In the less consistent there were also granules, but some of them had in many places aggregated into distinct corpuscles; it seemed as if the breaking down of the pus corpuscle, and the giving forth of their contained granules had not proceeded to the same extent. These, then, had been abscesses, and were in process of repair by absorption. There was Bright's disease of the kidney in this case.

Remark.—About the same time somewhat similar appearances were brought to my notice in a preparation sent to me from the European General Hospital. In this the membranous sac was distinct, the contents being partly pulpy, partly tough, and presenting an appearance of layers. It was in the cirrhotic liver of an emaciated sailor, who died of ascites. In this case there was also granular degeneration of the kidney.

Hepatic Abscess opening into the Pericardium.—This is admitted by all writers to be of rare occurrence. Rokitsansky and Graves each report a case. There is one recorded in the second Number of the second series of the Transactions of the Medical and Physical Society of Bombay by Mr. Fowler; and Mr. Leahy, a very intelligent apothecary of the Bombay establishment,

gave me the notes of a case which he had observed at Peshawur in the Bombay Fusilier Regiment. In this case there were two abscesses; one communicating with the right lung, the other with the pericardium. I have myself never witnessed this issue of hepatic abscess.

Into the Hepatic Duct.—This is stated in systematic works to be the most favourable course for hepatic abscess to follow; but surely this statement rests altogether on theoretic grounds. The only case with which I am acquainted, which proves that hepatic abscess sometimes communicates with the ducts, and may be discharged by this channel, is recorded by Dr. Leith in the following words:—"The case of a foot-artilleryman, sent from Bombay with abscess of the liver, who died in the hospital, is worthy of notice, although he does not come properly within the subject of this report. The tumefaction in the side gradually disappeared; and after his death the abscess was found nearly empty, and two hepatic ducts communicating with it were found carrying pus to the duodenum."*

Into the Cavity of the Peritoneum.—My cases hardly afford direct evidence of rupture of hepatic abscess into the sac of the peritoneum. In cases 244, 245. this issue was probable, but was not positively established.

Recovery by Absorption.—I have now described the different directions in which hepatic abscess may tend and discharge its contents; and we have found that, in a small proportion of the cases, recovery is the consequence. But it is not only by following this course that hepatic abscess may be recovered from. Cases occasionally present themselves in which the existence of abscess has been undoubted, and in which the fluctu-

* Transactions of the Medical and Physical Society of Bombay, No. iv. p. 57.

ating swelling gradually lessens and finally disappears without any appreciable discharge.* The inference which may be drawn from clinical observation, that the disappearance of the abscess has been effected by a process of absorption, is confirmed by appearances occasionally found after death. The process would seem to be of this nature: first, a good capillary circulation in the tissues around; then absorption of the liquor puris, shriveling and breaking up of the corpuscles into their constituent granules—an encysted putty-like or cretaceous residuum being left. The two cases which I shall presently narrate, and case 223., will serve to illustrate this statement, which is quite in accordance with opinions expressed by Rokitansky in respect to this absorption process.

224. *Two Hepatic Abscesses in process of Absorption.—Death from Cholera.—Painful Decubitus on Right Side explained by the Situation of one of the Abscesses.—Ulceration of Colon.*

Annajee, a Hindoo labourer, of thirty-two years of age, accustomed to the moderate use of spirits, and of six grains of opium daily, after eight days' illness was admitted into the clinical ward on the 10th December, 1850, not reduced by sickness. The respiration was somewhat hurried and oppressed, occasional bronchitic rales were the only signs of pulmonic disease. The abdomen was full and somewhat resistant. On the right side, dulness on percussion reached from the sixth rib to a line drawn obliquely from the left eighth costal cartilage to the point of the last right rib. Between this line and the margin of the ribs, there was distinct induration, and pain increased by pressure. Decubitus dorsal, and on the left side, but causing

* I have not thought it necessary to consider the question of the discharge of the contents of hepatic abscess by kidney elimination. I am quite of opinion with those who believe that the transfer of entire pus corpuscles from the liver to the urine, through the blood and secreting processes, is physiologically impossible.

pain, and distress of breathing on the right. There was febrile disturbance, a tremulous tongue, and regular bowels. The local symptoms had been present eight days, and the febrile five. On the 23rd he complained of pain of the right shoulder. Under the use of cautious leeching, small blisters, and quinine, combined with ipecacuanha and blue pill, the induration and dulness below the margin of the right ribs had almost disappeared by the 29th. But the pain of right shoulder continued, and the cough was more troublesome, with increase of bronchitic rales. The urine was frequently examined: it was generally free, somewhat turbid, and without albumen. On the 7th January the induration was gone, and the dulness extended about an inch below the ribs; the pain of shoulder had ceased, and the cough was less troublesome. Had recurrence of febrile disturbance on the 13th, symptoms of cholera came on on the 15th, and he died on the morning of the 16th. There were slight dysenteric symptoms on the 18th and 19th December.

Inspection six hours after death.—*Abdomen.* On opening the cavity, the thin edge of the right lobe of the liver was seen projecting to the extent of about an inch beneath the ensiform cartilage and the cartilages of the eighth and ninth ribs of the right side. There were firm adhesions of the most prominent part of the convex surface of the right lobe to the under surface of the diaphragm, and a good deal of difficulty was experienced in removing the organ from the abdominal cavity. On incising the right lobe of the liver at the site of the adhesions and corresponding in situation to the bodies of the seventh and eighth right ribs, there was a small abscess seen of the size of a pigeon's egg, with firm membranous walls, and containing healthy pus. Between the cavity of the abscess and the diaphragm there was only a small part of the substance of the liver left. A little above and to the left of this there was another abscess of the size of an olive; also bounded by a membranous cyst, and containing a yellow pultaceous putty-like substance, which was amorphous and granular, with here and there a corpuscle under the microscope. The rest of the liver was healthy. The small intestine was distended with gas, and the large one was contracted. At the end of the ileum the mucous membrane presented enlarged glands, and here and there small superficial ulcers were observed in the sigmoid flexure, and the upper part of the rectum. Otherwise the coats of both the small and large intestines were healthy. Spleen, of smaller size than natural. The kidneys were healthy.—*Chest.* There were firm adhesions of both lungs to the costal pleuræ, and of the base of the right

lung to the convex surface of the diaphragm. The pulmonary tissue was in part crepitating, and in part woolly to the feel, and when incised presented a pale appearance, intermixed with numerous black specks. The heart was healthy.

225. *Four Hepatic Abscesses.—General Peritonitis, but no Evidence of Abscess Rupture.—Two of the Abscesses in process of Cure by Absorption.*

Dajee Gungajee, a Hindoo buggy driver, of thirty-three years of age, using spirits habitually, was admitted into the clinical ward on the 4th December, 1851. The countenance was anxious, the respiration short, hurried, and thoracic; the abdomen was tense, tender, and somewhat tympanitic; the decubitus was dorsal, and the thighs flexed; the skin was coldish, and the pulse thready. The tongue was coated white on the sides, but florid at the tip and centre. His illness commenced seven days before with fever, followed by uneasiness below the right false ribs, which gradually extended over the abdomen, and three days ago attained its present severity. Under the application of a blister to the abdomen, the use of quinine and opium, wine and ammonia, he lingered till the 9th December. He had received a blow on the right side of his chest two months before the present attack.

Examination nineteen hours after death.—Chest. There were some old adhesions between the base of the right lung and the diaphragm. The substance of both the lungs was healthy. The heart of natural size and normal. Slight firm deposit on the lining membrane of the ascending aorta.—*Abdomen.* There was about a pint of red-tinged serum in the cavity of the abdomen. The intestines were distended, and presented streaks of redness on the peritoneal surface, and flakes of lymph existed between the convolutions as well as between the lateral parietes and the ascending colon.—The liver, much enlarged, extended three inches below the margin of the right false costal cartilages, and across to those of the opposite side. Extensive lymph effusion existed between the left lobe of the liver and the anterior parietes. The concave surface of the liver was firmly adherent to the transverse colon, to the stomach at its pyloric extremity and to the duodenum, by much lymph effusion. There were also firm adhesions between the convex surface of the liver and the diaphragm, and the posterior wall of the abdomen. On separating the adhesions between the concave surface of the liver, stomach, and duodenum, the walls of an abscess in the

liver gave way about an inch to the left of the gall-bladder, which was firmly adherent to the colon. The abscess was about the size of a large orange, and yellow flaky matter was attached to the inner surface of the membranous cyst which enclosed it. In the centre of the right lobe of the liver was another abscess of the size of a cocoa-nut, not communicating with the one on the concave surface, but just above it; it contained thick flocculent pus, enclosed by a thin membranous layer. At the posterior edge of the right lobe there was another abscess distinct from the two above described. It was about the size of a hen's egg, and contained thick putty-like pus; the walls were of thickened membrane more organized. In the left lobe towards its concave surface there was included, in a still thicker membranous sac, a fourth collection of still more consistent and putty-like contents; it was of the size of a walnut. The concave surface of the liver immediately over this cyst had a somewhat depressed and puckered appearance. The substance of the right lobe of the liver presented generally a dark red colour, and was not softened; the left lobe was of pale colour, and more lacerable. The putty-like contents of the third and fourth abscesses, submitted to the microscope, presented no trace of pus corpuscles, but consisted of small granular matter, with apparently an oil globule here and there. The spleen was much smaller than natural. The right kidney more congested, and presented a lobulated appearance; the left somewhat pale. — The mucous membrane of the stomach presented variegated patches of redness, best marked at the lesser curvature.

Secondary Partial Peritonitis. — Circumscribed Puriform Sacs. — It has been already stated (p. 600. and 604.) that the occurrence of secondary inflammation of the peritoneal covering of the liver at some period or other in the course of hepatic abscess, and consequent adhesion to the opposing parietes or viscera, is the rule. In occasional cases, to be afterwards adverted to, there is absence of peritonitic inflammation. But in other cases there is deviation in another respect, and to this I am desirous at present of directing attention. There are cases in which the secondary peritonitis has not caused adhesion at all points; but part of the exuded lymph degenerating into pus has led to the formation of a

circumscribed purulent sac between the liver and the opposed surface. The most common situation in which this process has been observed is between the liver and the diaphragm; but it may occur also in relation with the concave surface of the organ. Sometimes the sac communicates with the hepatic abscess. More frequently, however, it is merely superimposed. That the formation of the purulent collection is consequent upon degeneration of the lymph of the usual secondary peritonitis, and not on abscess rupture, is, I believe, the correct opinion. The occurrence may be held to indicate a depraved diathesis.

There is also a practical importance in this pathological fact. It teaches us to be very cautious in attributing a distinctly pointing fluctuating swelling in the right intercostal spaces below the seventh to the presence of hepatic abscess. It is quite as likely to be caused by a purulent sac formed between the liver and the diaphragm.

The following cases (226. to 231.) are submitted in confirmation of these observations; also 296, 297. 304. 308.

226. *Amputation of the Right Hand, followed by general Bad Health and Chronic Hepatitis.—A Purulent Sac between the Liver and the Ribs filled with Fætid Pus.—Hepaticization of the Lower Part of the Right Lung.*

Gresham Stewart, aged thirty-one, gunner's mate Honourable Company's steamer "Cleopatra." On the 29th July, 1842, the right hand was amputated above the wrist in consequence of a severe injury received while incautiously extracting the charge of a gun. The operation was performed immediately after the accident. On the 8th August he was admitted into the European General Hospital. Union had not taken place and the stump presented a sloughy appearance. He, by degrees, however, improved, and was discharged well on the 5th Oc-

tober. He was re-admitted on the 5th November, sallow and reduced, with feeble pulse, complaining of occasional shooting pain of the right hypochondrium, and at times suffering from diarrhœa. He continued labouring under these symptoms more or less till towards the end of January, when the pain of the right hypochondrium increased and became more constant, with coated tongue and sharpish pulse. This state was little alleviated by the treatment pursued, and he daily lost strength. On the 10th February, it was reported that there was distinct hard swelling of several inches in circumference over the lateral part of the right false ribs, commencing about the sixth rib and extending to the tenth. There was no perceptible fluctuation. During the night of the 11th, there was hæmoptysis to a considerable extent, succeeded the following day by cough with rusty-coloured sputa, at times in considerable quantity. Under these symptoms, much harassed by the cough, he lingered, and died on the 27th February, very much emaciated.

Inspection twelve hours after death.—The body much emaciated.—*Abdomen.* Between the liver and the ribs there was a sac containing fœtid dark-coloured pus; the walls of the sac being sloughy and ragged. [This purulent sac was opposed to the site of the tumefaction during life, but there was no purulent effusion between the ribs and the integuments, nor had the pus made a way through the intercostal muscles.] The peritoneal surface of the liver was in one or two places abraded, but the substance of the organ was not implicated. There was no communication between the abscess and the sac of the pleura, or the lungs.—*Chest.* The right lung adhered to the costal pleura and to the diaphragm, and was in the first stage of hepatization, giving out frothy blood-coloured serum when pressed. There was a considerable quantity of serum in the pericardium. The other viscera, though attenuated, were healthy.

227. *Abscess in the Liver.*—Also one external and circumscribed communicating with former.—Dark-red Colour of Mucous Surface of Large Intestine, which contained much Clotted Blood.

Serjeant O. M——, of Her Majesty's 40th Regiment, aged thirty-two, was admitted into hospital at Belgaum, on the 21st June, 1830. This man was a hard drinker, and was said to have been ill with dysentery fourteen days before admission.

There was much purging with severe tenesmus and griping. The dejections were scanty, mucous and bloody, then became red, watery and foetid, and for the last two days before his death consisted entirely of grumous, dark-coloured blood. Tenderness of abdomen moderate. He sunk gradually, and died July 2nd. No ptyalism had been induced.

Inspection.—On opening the abdomen a superficial abscess presented itself; situated on the superior surface of the thin edge of the right lobe of the liver, having for its walls posteriorly, the liver, anteriorly the abdominal parietes, inferiorly the colon extremely distended and adhering to the margin of the liver. The abscess dipped down between the ascending colon and the concave surface of the liver, and then communicated with another abscess, which occupied the whole interior of the right lobe of the liver; and below it terminated in a large collection of pus, situated behind the caput cœcum. The cœcum and ascending colon were internally of dark-red colour, and filled with clotted blood; and in parts of the colon the peritoneal was the only tunic left. The liver was light-coloured, and adhered to the right side and to the diaphragm. Adhesions existed between the right lung and diaphragm, opposite to those of the liver with the same muscle.

228. *Hepatitis.* — *Abscess by Interstitial Infiltration, bounded beyond by a firm Sac.* — *A Circumscribed Abscess in the Peritoneal Cavity over the Edge of the Liver.*—*Substance of the Liver mottled Red and White.*

Thomas Conolly, aged forty, of slight habit, a seaman, admitted on the 24th March, 1841. He stated that he had suffered from acute pain of the right hypochondrium at the margin of the ribs, for four days, attended with frequent purging. The pain was acute, preventing full inspiration, and extending downwards in the direction of the right iliac region. Pulse 100, sharpish, but easily compressed. Skin moist. Tongue coated in the centre, and florid at the tip. He was bled to xvi. ounces and freely leeches: he bore the depletion badly. The pain continued unabated, and frequent vomiting was super-added. Then, on the 28th, there was fulness and tenseness extending from the right iliac fossa to the margin of the ribs and reaching as far as the umbilicus. The left side was supple. He died at midnight of the 30th. At the beginning, two full doses of calomel with opium were given; it was then omitted

and nothing given, but camphor mixture and spiritus ammoniæ aromaticus and wine.

Inspection seven hours after death.—*Head.* The brain was firm, and there was a thin veil of serum beneath the arachnoid membrane at the interspaces of the convolutions.—*Chest.* The lungs did not collapse, in consequence of their emphysematous state.—*Abdomen.* The omentum adhered in places to the intestines and also to the edge (partly overlapping it) of the right lobe of the liver. There was a portion of the substance of the liver, the size of a large orange at the thin part of the right lobe, of white colour, in parts tolerably firm, in others pulpy, in others breaking down into pus,—bounded by a firm sac, from which the white part could be scraped; and over that portion of the liver there was a circumscribed abscess bounded by the abdominal parietes, the omentum, and liver. The substance of the liver generally was mottled red and white. The colon contracted, with ulcers, here and there, on its mucous coat.

229. *Dysentery accompanied with Abscess in the Liver.*—
Also a Sac between the Liver and Diaphragm.

Joseph Higgs, aged twenty-one, private of Her Majesty's 15th Hussars, just arrived from England, was admitted into hospital after five days' illness with dysentery, on the 10th December, 1839. He was freely bled, &c., but not brought under the influence of mercury. The dysenteric symptoms were sometimes better and sometimes worse, then febrile exacerbations with remissions came on. He died on the 30th January.

Inspection.—*Abdomen.* There was a circumscribed purulent sac between the liver and the concavity of the right false ribs. Also two abscesses in the right lobe near the diaphragm. The large intestine was ulcerated throughout.

230. *Abscess in the Liver communicating with Purulent Deposit in the Right Iliac Region.*—*Habitual Constipation.*—*The Sigmoid Flexure of the Colon much contracted.*

A gentleman, aged about forty-six, of full habit, and subject to occasional attacks of gout and rheumatic swelling of the joints, after a residence of twenty-seven years in India, at the end of 1832 (previous to which time, though subject to constipation, he

had never suffered from acute visceral disease), was attacked with inflammation of the bowels attended with constipation and requiring much general and local depletion for its removal. After convalescence he went to the Cape of Good Hope, resided there one year, and returned to Bombay at the commencement of 1835. About two months before I saw him, consequent on exposure to cold, and irregularities of diet, diarrhœa supervened, alternating with occasional constipation, and scybalous discharges. When he came under my care on the 17th April, 1835, he was much reduced from his usual fulness. The expression of countenance was languid and anxious. The tongue was florid. The bowels were relaxed, the dejections being of dark-green colour, watery and offensive. There was tenderness on pressure of the right iliac region. It would be tedious to detail the various modifications which these symptoms presented, or to note the different remedies which were from time to time unsuccessfully exhibited. On the 27th April, occasional drowsiness was for the first time observed, and there was increasing weakness and sinking. Death took place at noon of the 2nd May, having been preceded by vomiting of inky coloured fluid.

Inspection four hours after death.—*Abdomen.* The parietes of the cavity and the omentum were loaded with fat. The stomach was much distended, and filled with dark inky coloured fluid, but with the exception of softening of some points of the mucous coat, was healthy. There was an abscess in the right iliac region, circumscribed by part of the concave surface of the liver, the fundus of the gall-bladder, a matted portion of the omentum, the ascending colon, and the right kidney. This purulent deposit communicated with an extensive, but very superficial abscess, on the inferior surface of the liver, to the right of the lobulus Spigelii. The descending colon was contracted, and the sigmoid flexure was of about the diameter of a swan's quill. The mucous lining of the cœcum and ascending colon was thickened, and presented black mottled patches with the traces of cicatrices. All the coats of the descending colon and of the sigmoid flexure were thickened, but there was no puckered irregularity of the inner surface. The small intestine was filled with dark green viscous contents.

Remark.—There is an omission in this case,—the absence of the examination of the state of the kidneys.

231. *Hepatitis.*—*A Circumscribed Sac between the Liver and the Ribs.*—*An Abscess in the Substance of the*

Right Lobe.—The Mucous Coat of the Colon studded with Circular Ulcers.

George Bignell, of moderate habit, aged twenty-eight years, and nine months resident in India, for three days before admission into hospital on the 2nd January, 1840, had suffered from pain of the right side, shooting to the shoulder and impeding full inspiration. He was twice freely bled and very freely leeches and blistered; and on the 8th, 9th, and 10th, he was mildly under the influence of mercury. He did not convalesce in a satisfactory manner, and on the 29th there was recurrence of the pain of the side, and the liver was distinctly felt two inches below the ribs. The fulness below the ribs became subsequently more distinct, and there was hepatic sound almost to the nipple. He suffered frequently from pain of the side, became emaciated, subject to hectic and diarrhoea, with a tongue florid at the tip. He died on the 26th February.

Inspection.—Head. There was an ounce of serum at the base of the skull and a veil of serum between the arachnoid and pia mater on the convex surface of the brain.—*Chest.* There were old adhesions of the right lung to the diaphragm and posterior parietes, and firm adhesions of the liver to the concavity of the ribs. There was a circumscribed purulent sac between the surface of the liver and the ribs. The liver extended three inches below the margin of the ribs, and in the upper part of the right lobe there was an abscess, the size of a hen's egg, with flocculent walls. The mucous coat of the stomach was of red-brown colour, but sound in texture. The mucous coat of the large intestine presented a surface of closely set circular ulcers, in places running into each other and giving a honey-combed appearance to the membrane; in places the margins of the ulcers were of bright red colour, and were generally softened in texture.

Secondary Pleuritis, leading to General or Circumscribed Empyema.—It has just been shown that secondary inflammation of the hepatic peritoneum may lead to the formation of a purulent sac instead of adhesions only. A reference to the cases quoted in different parts of this chapter will show that a secondary diaphragmatic peritonitis is very frequently associated with a secondary diaphragmatic pleuritis, leading to adhesion between the base of the right lung and the diaphragm. But just

as in the instance of the peritoneum, we have in respect to the pleura a similar deviation from this rule. Instead of adhesions taking place, or sometimes in association with them, the lymph degenerates into pus, and a general or a circumscribed empyema is the consequence. Now it is well to be aware of the fact that we may have empyema coexisting with hepatic abscess, not caused by communication, but merely by extension of inflammatory action through the diaphragm,—in individuals prone to lymph degeneration. It appears, then, that empyema, from communication, or independent of it, is not an unfrequent complication of hepatic abscess; and its occurrence serves to render the diagnosis obscure. The signs of the empyema may be attributed to liver encroachment on the chest; or, if rightly interpreted, they may throw a doubt over the previous diagnosis of hepatic abscess.

It is not, however, only in the pleura that we have evidence of extension of inflammation from one diaphragmatic surface to the other. It occurs, but much more rarely, in the *pericardium* also. Of this I have met with two instances (236, 237.). In one the relation of the pericarditis to hepatic abscess was well shown. These two cases, and four (232, to 235.) illustrative of my remarks on empyema, are here submitted. The latter may be considered in connexion with cases 306, 307, which exemplify the same morbid state.

232. *Abscess in the Liver. — Empyema of the Right Pleura. — Symptoms not well marked. — Dejection of a Pint of Clotted Blood before Death. — Mucous Coat of the Colon Dark Red, with Ulceration.*

Richard Dunstan, aged thirty-nine, two years in India, was admitted on the 16th January, 1841. He was reduced in flesh, having been ill for several days, and having taken no food. He

complained chiefly of uneasiness at the epigastrium not amounting to pain, nor increased by pressure, full inspiration or decubitus on either side. Skin moist. Pulse 112, feeble, and easily compressed. He continued languid, depressed, with collapsed and anxious countenance, feeble and quick pulse, tongue sometimes dry in the centre, sometimes brownish, bowels generally scantily moved, but on the 23rd there was passed by stool more than a pint of clotted blood. He died early the following morning.

Inspection eight hours after death.—*Chest.* The heart and left lung were healthy. Adhesions connected the third lobe of the right lung to the diaphragm, and there were about thirty ounces of sero-purulent fluid in the right sac of the pleura. Flakes of lymph lined the costal pleura and parts of the pulmonary pleura. —*Abdomen.* The liver filled both hypochondria, the right lobe adhered to the diaphragm, and in that lobe there were two abscesses of considerable size. The left lobe was healthy in texture. There were patches of vascularity here and there in the stomach. The colon contained dark claret-red slimy contents; the mucous coat had, throughout, a reddish tint and presented several patches of ulceration.

233. *Abscess in the Liver.—Effusion of Four Pints of Serum, with Lymph, in the Right Pleura.—Ulcerated Colon.—No Coma.—Serum between the Pia Mater and Arachnoid, and Two or Three Ounces at the Base of the Skull.*

James Roberts, aged twenty-nine, a gunner, of feeble habit, was under treatment for acute hepatitis, from the 30th April to the 16th May, 1839. He was bled and leeches freely, took calomel and opium, but not to ptyalism and he was discharged well. Was re-admitted into hospital on the 5th June, affected with diarrhoea, which, under much variety of treatment, continued more or less troublesome. On the 3rd July, distinct hardness and tumefaction between the margin of the right ribs and the crest of the os ilium, was first noted. Blisters were frequently applied without benefit. He continued to lose ground. Became more emaciated and sallow, and on the 3rd August, it is noted for the first and only time, that he had been much troubled with cough during the previous night. The sinking increased, and he died at 3 P.M. of the 24th.

Inspection fifteen hours after death.—No evident tumefaction

of either side of the abdomen or chest.—*Head.* The membranes were exsanguine. The convex surface of the brain was veiled with a thin layer of serum, and there were between two and three ounces at the base of the skull.—*Chest.* The right sac of the pleura contained about three or four pints of clear fluid serum at the upper part, thickened with flocculi of lymph at the posterior and lower parts. The costal and pulmonary pleuræ were coated with adherent flocculi of lymph. The lung was condensed against the mediastinum. There was about half a pint of serum in the left pleura, and about three ounces in the cavity of the pericardium. The left lung and the heart were healthy.—*Abdomen.* The right lobe of the liver extended for three inches below the margin of the right ribs; and the edge of the lobe, to the right of the gall-bladder, was occupied by an abscess, the size of a large orange with dense fibrous walls. The hepatic flexure of the colon and part of the omentum were matted to the walls of this abscess. Close to the diaphragm there was another abscess in the right lobe, and there were adhesions of the convex surface of that lobe to the diaphragm. The rest of the surface of the liver was mottled white. The mucous coat of the cœcum was studded with small follicular ulcerations, some of them cicatrizing. The rest of the mucous coat of the colon was nearly healthy. Stomach healthy. The kidneys were both rather enlarged. The left of buff colour, with the tubular and cortical parts not well defined. The right one was nearly natural in texture, with buff streaks of the cortical part. There was about a pint of serum in the cavity of the abdomen.

Remark.—The record shows a want of attention to the physical signs, as the existence of the pleuritic effusion does not seem to have been detected.

234. *Abscess in the Liver.—Empyema of the Right Side.*
—*Admitted Emaciated and Sallow.—The Symptoms at first obscure.*

William Campbell, aged thirty-seven, was admitted into the European General Hospital on the 27th October, 1841. He was emaciated and his complexion was sallow, the skin was hot and dry, pulse 100 and feeble, tongue slightly tremulous and coated in the centre. There was tenderness and fulness of the epigastrium with irritability of stomach and thirst. He was affected also with frequent short cough and his hands were tremulous. He stated that he had been ill for a week, but would

not admit that he had been drinking freely. He lingered till the 11th November, when he died. The cough was present more or less without expectoration. The uneasiness of the epigastrium continued with fulness which was described, on the 2nd November, as having increased and being more defined at the margin of the right ribs, and beyond, in the direction of the epigastrium. On the 5th the tumefaction at the epigastrium was prominent and tense; there was no diarrhœa. The treatment consisted in the application, in the first instance, of a few leeches to the epigastrium, and subsequently in the exhibition of anodynes and other palliatives.

Inspection eight hours after death.—The right lobe of the liver was completely occupied with an abscess containing sero-puriform fluid. The sac of the right pleura was also filled with similar fluid.

235. *A Small Purulent Sac circumscribed in part by the Base of the Right Lung and by the Diaphragm, and extending to the Fissure between the Second and Third Lobes of the Right Lung, mistaken for Hepatic Abscess.*

Serjeant James Deans, aged twenty-nine, of feeble habit. From November 1842 to April 1843, was almost continuously under treatment in the Artillery Hospital, suffering from dysentery, attended at times with much abdominal tenderness. From the 5th to the 21st December, he was again under treatment for a similar complaint. On the 29th January, 1844, he was readmitted with febrile symptoms attended with cough, pain of chest and frothy expectoration. These symptoms continued with more or less alleviation, and the sputa at times assumed a globular appearance with rusty tinge, till the 7th February when he was transferred from the Artillery to the European General Hospital. The cough continued troublesome, there was occasional hectic fever; the expectoration became more copious and puriform in character with a reddish tinge, more or less deep. A mucous rale was heard over the chest. He continued under these symptoms, gradually losing strength, and latterly suffering from a complication of dysenteric symptoms, and died on the 31st March.

Inspection six hours after death.—The body much emaciated. —*Chest.* The left lung was healthy and collapsed completely. The right one adhered in parts to the costal pleura and very generally to the diaphragm. The upper lobe was collapsed. Between the base of the lung and the diaphragm, and also in

the fissure between the second and third lobe, there was a circumscribed sac containing about six ounces of thick pus and the portions of the lung adjacent to it were indurated and hepatised. There was no communication through the diaphragm. — *Abdomen.* Old adhesions connected the omentum in several places to the abdominal parietes. The liver was much enlarged, grey and indurated, and extended to the crest of the os ilium, but was without any abscess.

236. *Hepatitis.—Abscess in the Liver.—Five Pints of Pus in the Sac of the Right Pleura.—A Layer of Lymph on the Surface of the Heart and Inner Surface of the Pericardium.—General Peritonitis, with Effusion of Lymph and Sero-Purulent Fluid.*

Stephen Cain, a pensioner, aged fifty, of broken habit, after eight days' illness was admitted into hospital on the 24th January, 1840. He complained of pain of the right side, shooting from the margin of the ribs to the shoulder. On the 4th February there was tenseness, fulness, and hardness, at the margin of the right ribs, and the pulse was feeble. The feebleness of the pulse continued. On the 7th the breathing was somewhat oppressed, and there was general distention of the abdomen with pain from time to time. He died on the 4th February.

Inspection.—There was an ounce of serum at the base of the skull.—*Chest.* There were five pints of pus in the sac of the right pleura. The inner surface of the pericardium, and outer of the heart, were red and roughened by a thin layer of firm granular lymph. There was commencing disease of the aorta above the valves, but no hypertrophy of the heart.—*Abdomen.* The liver projected two or three inches beyond the margin of the ribs, and there was an abscess about the size of an orange, and circumscribed, chiefly between the diaphragm and the upper surface of the liver. The peritoneal surface of the intestines was dark red. The convolutions were united by flakes of lymph, and sero-purulent fluid was effused among them. The mucous coat of the stomach was of dark leaden grey colour.

237. *Pericarditis.—The Inner Surface of the Pericardium and the Outer Side of the Heart covered with a thick Layer of Irregular Lymph.—Also Effusion of*

Serum and Displacement of the Liver, partly caused by the distended Pericardium.—Abscess of the Liver.

John Devair, aged twenty-five, seaman, was admitted on the 12th November, 1840. He stated that he had been ill for two months and a half; that his complaint began with pain of the abdomen shooting from the hypogastrium and the left side, thence through the chest. These symptoms were not attended with either diarrhœa or constipation or difficulty of micturition; but his statement was confused. He passed a restless night, and on the 13th, the epigastrium was tense, resisting, and painful on pressure; and on percussion, the sound was dull almost to the umbilicus, also midway between the crest of the os ilium of the right side and false ribs, and extended into the hypochondrium. The breathing was a good deal oppressed; the skin above natural temperature; pulse 120, feeble and compressible; tongue pretty clean.

Physical signs.—Anteriorly on the right side of the chest and below the nipple, the sound was clear on percussion. On the left there was much dulness about the cardiac region, extending to the arch of the left false ribs and to the sternum; no bulging. Respiratory murmur on the right side anteriorly, good; on the left, clear but fainter, with a blowing sound in the line of the sternum. Posteriorly on the right side, clear; on the left, fainter with occasional crepitus about the scapula. The action of the heart at the apex not increased, it was rapid but the two sounds were clearly marked. Between the nipple and the sternum, and extending to the right side, the action of the heart was more perceptible, and the sounds were increased in loudness. In the line of the sternum there was an abrupt, sometimes clacking, single sound, mixing with the blowing sound of the respiration. He continued suffering from oppressed breathing, the pulse frequent, small, and unequal, the surface sometimes above the natural temperature. There was frequent short cough, a sense of weight in the line of the sternum, and chiefly at its lower part, with occasional paroxysms of pain shooting from the left side, upwards in the line of the sternum, excited by motion and eructation. When he turned on the right side, the pain affected the right mammary region; when he turned to the left, it was chiefly felt below the left false ribs. He was easiest on the back. Urine, generally scanty and high-coloured, was tested with heat, on one occasion, and found not coagulable. The abdomen was generally full and tense. On the 20th the uneasiness of the chest and dyspnœa were increased, and he had suf-

fered from rigors; the pulse was 100, very irregular, unequal with occasional intermission; the abdomen full and tense. Between the left nipple and the sternum, the action of the heart was perceptibly increased; and there was a very distinct fre-missement, more distinct at that situation than at the apex of the heart. There was now almost constant orthopnoea; pulse very feeble. On the 23rd the fre-missement had ceased. He died on the night of the 24th. The treatment is hardly worth alluding to; he was cupped, leeches, blistered, took mercury with morphia, &c.

Inspection ten hours after death.—Body not much emaciated.—*Chest.* The pericardium completely occupied the anterior part of the chest and extended into the right side for some distance; its transverse diameter was fully ten inches, and it reached from the top of the sternum to the diaphragm, to which muscle it adhered firmly, as also to the inner aspect of both lungs. There were about twenty-two ounces of clear serum in the cavity of the pericardium. The inner surface of the pericardium was lined throughout with a layer of lymph, a line in thickness, with a rough reticulated inner surface of dark-red colour; this layer could be peeled from the pericardium with tolerable facility. The outer surface of the heart was coated with a similar layer of lymph, more firmly adherent, however, and presenting a more irregular and reticulated external surface; where the greatest irregularity existed, thence (chiefly at the posterior part) had passed thick bands of firm but friable lymph, about an inch or more in length, and which had connected the inner surface of the pericardium with the outer surface of the heart. The heart itself and the vessels were quite healthy. The lungs, with the exception of some old adhesions and some slight œdema, were healthy, and there was trifling serous effusion in the right cavity of the pleura.—*Abdomen.* The transverse colon, much distended with air, occupied the umbilical region. The liver extended four inches below the sternum, and about three below the last right false rib, and also occupied a greater than usual extent of the left hypochondrium. The liver had been pushed thus lower into the abdomen by the distended pericardium. There was an abscess in the left lobe of the liver, lined with a firm membrane with flocculent surface; it was the size of an orange, and was adherent to the diaphragm where opposed to the adhesions of the pericardium. The stomach was healthy. The cortical part of both kidneys was streaked white and red, and these organs were considerably enlarged.

Secondary General Peritonitis.—The occurrence of secondary general peritonitis in the advanced stages of

hepatic abscess is not an uncommon event. Its access is generally marked by symptoms sufficiently distinct; and copious lymph exudation, more or less degenerate, is found after death. It has been already stated, that abscess rupture into the cavity of the peritoneum is rare; and there can be no doubt that in the majority of instances general peritonitis is not due to a direct cause of that nature, but is merely another illustration of the tendency of secondary inflammations to occur in the course of hepatic abscess, and, by the form which they assume, to demonstrate the cachectic state of the system.

The six first (238. to 243.) of the nine cases which follow are of this nature. In respect to the three last (244. to 246.), there is doubt as to whether rupture of the abscess may not have assisted in two, and rupture of an intestinal ulcer in one. On this point of pathology reference may be further made to cases 265. 267. 308. 322.

238. *General Peritonitis, with Sero-Purulent Effusion.—Abscess in the Liver.—Symptoms obscure.—Abundant Effusion of Serum in the Head.—No Coma.*

William Morris, aged sixty-three, a weather-beaten sailor, who had made frequent voyages to Calcutta and China, but had enjoyed good health, was admitted into the European General Hospital on the 5th August, 1838. He stated that for eight days he had suffered from pain of the right hypochondrium and shoulder, that for the same period his bowels had been constipated, his urine scanty, and he had experienced occasional cough, exciting pain under the right false ribs. The tongue was rough and somewhat furred. The pain of the right side had been relieved by a blister, which continued to discharge at the period of admission. Pills of calomel, colocynth and gamboge, with a quarter of a grain of tartar emetic, were given, to be followed by a purgative draught if required. The pills were ejected, but the bowels were freely moved during the night; the dejections being copious, bilious, and feculent. On the 6th the skin was cool, pulse soft, tongue little furred, inspiration

free, and little complaint was made but from the irritation of the blister. A warm bath was used at bed-time, and a powder of Dover's powder and calomel taken. On the 7th the pulse and skin continued natural. He inspired freely, but was much depressed in spirits, and complained in a vague manner of uncomfortable feelings in the chest and epigastrium. The powder was repeated as on the previous night. On the 8th the bowels had not been moved, the tongue was somewhat furred and roughened into ridges, the pulse and skin continued natural, but the spirits remained depressed. He winced on pressure at the margin of the right false ribs, and there was some fulness of the abdomen. Seventy-two leeches were applied, and pills of calomel colocynth, and hyosciamus were given. On the 9th the side was easier; the bowels had been freely moved, and the dejections were thin, feculent, and bilious; pulse 80, feeble. Thirty-six leeches were applied to the sides, and a draught with tincture of muriate of morphia, given at bed-time. On the 10th he felt better. On the 11th the right side was again complained of, the skin was cool, the pulse soft, bowels free, evacuations yellow and watery, and the tongue rough and somewhat florid at the tip. A blister was applied to the side. On the 12th the tongue was dryish, and the evacuations were streaked with blood, but the pulse and skin continued natural. Calomel and opium were given, and after a few hours some castor oil. At the evening visit he was much depressed in spirits, the eyes were suffused and heavy, tongue dryish and rough, skin coldish and perspiring, pulse of natural frequency, but badly developed. He had been several times at stool, but little had been passed. The head was shaved, a blister was applied to the back of the neck, and three grains of calomel with two of quinine and quarter of a grain of opium, with aromatic confection, ordered every four hours. The night was passed with restlessness and moaning. He was frequently at stool, the dejections being copious, watery, and of olive-green colour. The tongue dry and red; there was no fulness of abdomen. Pulse 80 to 84, but badly developed. A diaphoretic draught with nitrous ether was given. At the evening visit there was heat of scalp, flushing of the face, pulse 92, sharpish, skin cool, but dry, no fulness of abdomen. Forty-eight leeches were applied to the temples, and afterwards ten grains of calomel, with three of ipecacuanha and two and a-half of opium were given, and the legs were well fomented. On the 14th his manner was more composed, and the depression less. Pulse 80 and unequal, eyes still suffused, and expression heavy, tongue not so dry. A pill of calomel two grains, of ipecacuanha and quinine each one and opium half a grain was given every four

hours; and the bowels having not been moved, the opium was omitted at the evening visit, and three grains of aloes with hyosciamus, substituted. On the 15th he was moaning and depressed; pulse 80, of moderate strength; skin warm and moist; abdomen supple. The pills were continued, and camphor mixture with nitrous ether and carbonate of ammonia, given at intervals. On the 16th, and the morning of the 17th, he seemed better, but his spirits continued depressed. At noon of the 17th, the respiration was hurried, and acute pain across the abdomen was complained of. There was a purplish tinge of the face and general surface; the skin was cold, and the pulse feeble. The pain continued excruciating and unrelieved by a warm bath, or turpentine and anodyne enemata. There was constant moaning, hurried breathing, and anxious countenance, with almost imperceptible pulse, and damp skin. He died about midnight.

Inspection ten hours after death.—Body not much emaciated. — *Head.* There was moderate vascular congestion of the pia mater, and in some places milkiness of the arachnoid membrane. At the base of the skull, and on reflecting the dura mater, from the convex surface, there was abundant effusion of serum; also about half an ounce in each lateral ventricle. — *Chest.* Both lungs were emphysematous, but crepitating. The right lung adhered generally to the costal pleura, and also to the upper surface of the diaphragm. The heart was healthy. — *Abdomen.* About three pounds of turbid puriform serum were effused into the cavity of the abdomen. The small intestine was distended, and with the large, had a dark grey leaden hue. The whole surface of the peritoneum, that of the abdominal parietes, of every convolution of the intestines, of the mesentery, of the stomach, and of the liver, was coated with thin flakes of yellow lymph, causing tender adhesions between the small intestine, the liver, and the anterior parietes, also of the convolutions of the intestines to each other. In some places this layer of lymph had assumed a thin firm membranous character, and in this form covered several feet of the small intestine. It seemed like an additional coat, and admitted of being easily peeled in considerable shreds. On removing this layer of lymph, the peritoneum underneath presented a red speckled appearance, in some places bright, in others of duller hue. The liver was not enlarged, it was, however, indurated, of dark chocolate mottled appearance, where incised. It adhered firmly to the diaphragm, and on attempting a separation, a superficial abscess was found, apparently immediately below the peritoneal lining, and con-

taining puriform serum. The mucous coat of the stomach was covered with tenacious mucus, was dark grey or mottled brown, in parts mammillated and thickened, but not softened. The mucous lining of the small intestine was healthy; that of the colon dark grey, with speckles of dark red, it was softer than natural, perhaps thinner, and in some places almost removed; the tissue beneath was more pearly and firmer. The cortical substance of both kidneys was paler than natural.

239. *General Peritonitis.—Abscess of the Liver following Head Symptoms.—Serous Effusion in the Head with Thickening of the Arachnoid Membrane.—The Kidneys had undergone Yellow Degeneration.*

Garrott Dunn, aged thirty-eight, of spare habit, was admitted into the European General Hospital, on the 6th August, 1838. He was deaf, and could not give a distinct account of himself. He articulated indistinctly. Complained of vertigo with a constant singing noise in his ears. He was bled from the arm, and cupped on the back of the neck, his head was shaved, and his bowels were freely acted upon by purgative medicine. He continued with more or less of these symptoms till the 17th October. Throughout this period, the deafness was constant, the vertigo and noise occasional. He was cupped, leeches, and blistered several times. Aperient medicine was from time to time exhibited. The action of mercury was induced mildly on the system. The decoction of sarsaparilla was also given, at one time with the hydriodate of potass, at another with corrosive sublimate. The head symptoms at one time presented a periodic tendency, and quinine was exhibited. No benefit resulted from these different courses of treatment, and on the 17th October, in addition to the former symptoms, tenderness of the abdomen was complained of attended with diarrhœa. Leeches were applied, and anodynes and absorbents given. On the 25th there was distinct fulness to the right of the epigastrium, accompanied with tenderness. Under these symptoms he gradually sunk, and died on the 8th November.

Inspection twelve hours after death.—Body emaciated.—Head. There was increased turgescence of the vessels of the pia mater on the upper surface of the brain and over the posterior lobes. There was also opaque thickening of the arachnoid membrane in many places, chiefly at the dipping down between the hemispheres of the brain. There was about an ounce and a half of serum in the ventricles, and a considerable quantity at

the base of the skull. The substance of the brain was quite firm and natural in all parts.—*Chest.* The lungs were healthy. A thin layer of old lymph for the extent of an inch in diameter was attached to the serous covering of the heart.—*Abdomen.* There was a small quantity of sero-purulent fluid in the cavity of the abdomen. The intestines were distended with gas, and adhered in places by flakes of lymph to the abdominal parietes. The whole of the peritoneal covering of the right lobe of the liver was covered with flakes of lymph, and there were flakes between the stomach and liver, and a close matting of the edge of the left lobe to the colon; that intestine was also closely embraced by the omentum. In the left lobe of the liver, at the point of adhesion to the colon (the site where there had been fulness and pain before death) there was an abscess, the size of an orange. The substance of the right lobe was healthy. In places of the mucous lining of the colon, there was dark grey discoloration. In others a thinning of the coats, chiefly to all appearances induced by the removal of the free surface of the mucous tunic. In the descending colon and sigmoid flexure, there were a few round ulcers, and some dark grey cicatrices. The mucous lining of the stomach was covered with adhesive mucus, was dark grey at the cardiac end, marbled dark red at the pyloric, but was neither softened nor thickened. The cortical substance of both kidneys had undergone yellow degeneration to a considerable extent.

240. *General Peritonitis.—Matting of the Omentum over the Cæcum.—Round Ulcers in the Colon, and an Abscess in the Liver.*

Antone Lopes, aged forty-two, a Portuguese seaman, who had arrived from Goa about two months before his admission into the European General Hospital, on the 22nd January, 1839. On admission into hospital, his countenance was sallow, and had an anxious expression. The abdomen was somewhat distended, and tense, and tenderness was complained of on pressure over the cæcum. The tongue was expanded and little furred. The pulse was feeble. He stated that he had been affected with dysenteric symptoms for about twenty days, that the purging, at first considerable, had decreased, and that the pain had increased, during the two or three days before admission. On the 23rd there was a distinct defined hardness felt over the cæcum. He gradually and slowly lost ground, and died on the 7th February. During

the progress of the disease the bowels were generally moved four or five times in the twenty-four hours, and the dejections were generally watery, sometimes of greenish, but most frequently of a light yellow colour, and passed without straining. The tongue was generally pretty clean. The skin was dry, but not often above the natural temperature, and the pulse seldom numbered more than 76. The tumour at the site of the cœcum continued distinct, till the 2nd of February, when the fulness and tenderness of the abdomen became more general. At first, leeches were applied to the abdomen, and at three different times a blister was applied. For the first two or three days, blue pill or calomel were given with ipecacuanha and opium, and afterwards sulphate of quinine, with a small quantity of hydrargyrum cum creta with opium and ipecacuanha. Then the ipecacuanha and mercury were left off, and the quinine was given with opium and aromatic confection.

Inspection five hours after death.—Body emaciated. Abdomen moderately distended.—*Head.* About an ounce and a half of serum in the cavity.—*Abdomen.* The omentum crossed from the ninth or tenth left false rib, adhered to the anterior parietes, passed obliquely to the hollow of the right os ilium, and thus divided the cavity into two parts. The upper contained about a pint of pus in a circumscribed sac lined with false membrane, and covering the projecting edge of the liver, the stomach, and part of the omentum. The lower division contained about two pints of clear serum with flakes of lymph. There was vascularity of the peritoneal covering of the small intestine and much matting of the convolutions in the pelvis, and to the bladder. The cœcum was matted firmly to the omentum and to the hollow of the os ilium, and tore readily on attempting to separate it. The descending colon was covered with flakes of lymph. There were round isolated ulcerations, the size of a six-pence here and there, in the colon. The liver was much enlarged and contained a large abscess in the right lobe lined with firm membrane; the parenchyma was of dark-red colour, and mottled white. The mucous lining of the stomach was thickened. The left kidney had partly undergone the yellow granular degeneration; the right one was not examined.—*Chest.* The thoracic viscera were healthy.

241. *General Peritonitis, with Sero-purulent Effusion and Abscess in the Liver.*

James Harrison, aged thirty-three, of slight habit, a sub-conductor in the Ordnance Department; was admitted into the

European General Hospital on February 25th, 1839. He had served thirteen years in India, had suffered from dysentery whilst at Deesa in 1829, and was under treatment in the General Hospital for fever about ten months before the present date. On admission, he stated, that some days previously, he had a cold and experienced uneasiness at the epigastrium, for which he was leeches and took medicines. Since the day before admission, there had been pain and much tenderness of the right iliac region. At the situation of the pain there was a defined knotty hardness, emitting a dull sound on percussion. It commenced about three finger breadths above the crest of the os ilium, reached to the margin of the right false ribs, and to within two or three finger breadths of the umbilicus. Pulse 88, small, sharpish. The tongue was pretty clean. Features sharp and anxious. He vomited the day before admission, but not since. One hundred leeches were applied to the abdomen, a warm bath ordered, and calomel with ipecacuanha and opium given. On the following day (26th), the pain continued; pulse 84, weak. A large blister was applied to the abdomen. At the evening visit there was no febrile exacerbation, the bowels had been four times moved by the castor oil, and the evacuations were yellow and watery. The pulse small and feeble. Calomel three grains, quinine two, and opium one, in the form of pill, were ordered at bed-time. From this time, the pain of the abdomen was more or less complained of, and on the 4th, the distention had considerably increased. The pulse was generally from 80 to 88, feeble and often thready; the skin was generally cold and damp; the tongue was moist and without fur, two or three watery yellow evacuations were in general passed daily. The treatment consisted of quinine in combination with hydrargyrum cum creta and half a grain of opium thrice daily. He died on the night of the 5th.

Inspection eight hours after death.—Body not much emaciated. —*Abdomen.* Was moderately distended and tense. The omentum, vascular and thickened was matted over the transverse colon, the edge of the liver, and the cœcum. It also adhered firmly to the hollow of the os ilium. There was general redness over the peritoneal coat of the bowels with flakes of lymph. There were about three pints of sero-purulent fluid in the cavity of the peritoneum, chiefly between the right lobe of the liver and the ribs, and in the iliac and pelvic regions. The liver was of natural size, mottled and of pale fawn colour, except in the neighbourhood of two or three small abscesses in the right lobe, where the mottling was dark red. The coats of the cœcum and

colon were not thickened; their mucous coat was of dark grey colour, but not ulcerated. The stomach was healthy. In the left kidney the distinction of cortical and tubular portion was not well defined. The right kidney was healthy. The thoracic viscera were healthy.—*Head.* At the base of the skull there was an ounce of serum.

242. *Dysentery.*—*General Peritonitis.*—*Matting of the Omentum over the Colon.*—*Sloughy Ulceration of all the Coats.*—*One Small Abscess in the Liver.*

E. Burnard, aged fifty-eight, seaman of the French ship "St. Cicilia," after being ill for fifteen days with diarrhœa and occasional vomiting, was admitted into the General Hospital on the 25th September, 1841. The abdomen was full but without pain, pulse 104, skin cool, tongue moist, and the surface of the body was dirty. He was ordered a warm bath, effervescing draughts, with tincture of opium, and at bed-time, some chalk and mercury with tincture of opium, and he was placed on milk diet. On the 26th several feculent dejections were passed and there was no vomiting. A few grains of blue pill, with two grains of camphor and a grain and a half of opium, were given at bed-time. He passed a restless night with colicky pains and vomiting. He was also purged seven or eight times, the dejections containing mucus tinged with blood. There was tenderness along the right side of the abdomen from the crest of the ilium to the margin of the ribs. The general fulness was rather less, the pulse was 68 and soft, and the tongue moist. Sixty leeches were applied to the pained part of the abdomen, followed by fomentation, and the ipecacuanha three grains, blue pill and gentian pills, with opium one grain added to each dose, were directed to be given every fourth hour, but to be intermitted if they caused retching or vomiting. The second dose caused vomiting. The pills were left off and an anodyne enema was exhibited at bed-time. During the night he was frequently purged. The dejections were light yellow, and did not contain much mucus. On the morning of the 28th, the abdomen was still tender on pressure; pulse 80. Sixty more leeches were applied, and Dover's powder, with chalk and mercury, was thrice given. The purging continued, the dejections tolerably copious and tinged with blood. On the morning of the 29th the abdomen was full and still uneasy on pressure to the right of the umbilicus, and at the margin of the right ribs. The tongue was without fur, pulse 92 feeble, skin moist and coldish, and the

countenance anxious. A blister was applied to the abdomen; acetate of lead three grains, and opium one grain and a half were given in the form of pill every fourth hour. On the 30th, the tongue was still moist. He was drowsy and the pills were continued with one grain of opium only. At the evening visit the countenance was more anxious. He was desponding and depressed. The breathing was somewhat hurried and the tongue was dryish in the centre. Three or four scanty dejections had been passed. The pulse was 96. The pills were omitted, and effervescing draughts with xv. minims of tincture of opium were occasionally given. He continued with little change in the symptoms, with the exception that the fulness of the abdomen increased, and he died on the evening of the 3rd October.

Inspection fourteen hours after death.—*Chest.* Both lungs were inflated, and there were strong adhesions of the right one to the costal pleura. There was about an ounce of serum in the left pleural sac. Heart healthy.—*Abdomen.* A general blush of redness over the intestines. There were tender adhesions of the convolutions of the small intestine to each other, and of the descending colon to the small intestine, and the lateral parietes. The omentum was thickly matted over, and closely adherent to the transverse and ascending colon, and the cæcum; it also adhered to the edge of the liver and to the gall-bladder. On separating the adhesions of the omentum from the ascending colon and commencement of the transverse, several patched up ulcerations gave way, and the contents of the gut escaped. The coats of the gut were in general readily lacerable. There was one abscess the size of a walnut, on the convex surface of the right lobe of the liver.

243. *Numerous Small Abscesses in the Liver.*—*A Part of the Left Lobe in a state of Grey, Pulpy Disorganization.*—*General Peritonitis.*—*State of Intestines not noted.*

Umboo Mamel, a Hindoo, aged thirty, brought by his friends to the hospital on the 2nd January, 1852, said to have been seized that day with vomiting and purging. There was firm fulness at the epigastrium, and tender abdomen. The pulse small and quick, and the tongue coated. He died on the 4th.

Inspection. A pint and a half of turbid fluid in the sac of the peritoneum, and friable adhesions existed between the intestinal

convolutions, confining pus deposits. There was adhesion of the concave liver surface to the stomach, and pus confined between; also matting of the omentum. The concave surface of considerable part of the left lobe, and to the depth of half an inch, was in a grey and pulpy broken down state, covered by peritoneum, but not circumscribed. Then, throughout both lobes there were many small abscesses ranging from a pea to a horse-bean in size. There was not anything to note in the intercurrent liver substance. The mucous membrane of intestines not noticed. There was an opaque patch on the heart. The internal surface of the aorta was irregular from deposit. The lungs were healthy. There was slight encroachment on the tubular part of the kidney noted.

244. *Peritonitis.—Ten Pints of Sero-purulent Fluid in the Cavity of the Abdomen, probably resulting from a Small Abscess in the Liver opening into the Sac of the Peritoneum.*

George Martin, aged twenty-three, seaman, ship "Palestine." After five or six days' illness was admitted into the European General Hospital on the 10th February, 1843. He suffered from dysentery, attended with tenderness of the right side of the abdomen. From the 20th to the 25th the bowels acted with tolerable regularity, but he had occasional pain of the right hypochondrium. After the 25th the pain of side increased, chiefly at the margin of the right false ribs, and there was at times a febrile accession towards evening, sometimes ushered in with rigors. He continued suffering more or less from pain of the side, but never to any great degree, associated, however, with frequent night sweats. On the 20th April, fulness about the lateral part of the ninth and tenth ribs was observed, and became more distinct on the 24th, and was attended with tension below the margin of the right ribs. On the 28th, after much vomiting during the night, there was pain and tenderness of abdomen with considerable tenseness, fulness and hardness, from the margin of the ribs to the umbilicus, and the bulging of the ribs, formerly observed, was less. The breathing was short, the countenance anxious, and the pulse thready. Under increasing fulness and tenseness of abdomen, occasional pain, and vomiting, feeble pulse, and increasing emaciation, he lingered till the 14th May, when he died.

Inspection five hours after death.—Chest. The viscera were

healthy. — *Abdomen.* There were about ten pints of sero-purulent fluid in the cavity, and the intestines were matted together and covered with flakes of lymph. The parts were so displaced that no distinct communication with an abscess in the liver was traced.

245. *Probably Small Superficial Abscess of Under Surface of Lobulus Spigelii, leading to Puriform Sac in Gastro-hepatic Omentum, and this by Rupture to general Peritonitis.—Jaundice.*

Ingan Khan, a Mussulman butler, using spirits in moderate quantity, of forty years of age, and in reduced condition, was admitted into the clinical ward on the 19th October, 1850. The respiration was somewhat hurried, partly abdominal and partly thoracic. There was some degree of general fulness of the abdomen, and a line drawn from the point of the right ninth rib to within two inches of the umbilicus, and then obliquely upwards to the eighth left rib, formed the lower limit of a distinctly full and almost circumscribed induration, of which the thoracic margin was the upper boundary; this space was dull on percussion, painful on pressure, deep inspiration, and coughing. There was some yellowness of the conjunctivæ, febrile disturbance, a coated tongue, constipated bowels, and high-coloured urine. The illness was of twenty days' duration, and commenced with febrile symptoms. These recurred every evening with chills, and terminated with sweating. Suffering much as on admission, he continued under treatment till the 29th October, when, in consequence of alleviation of the epigastric uneasiness, he was urgent for his discharge. He was re-admitted on the 1st November with anxious countenance, hurried and short respiration, and small frequent pulse, and skin about the natural temperature. There was epigastric tenderness, and some degree of general abdominal fulness; but the epigastric induration was scarcely perceptible, and the dulness was limited below by a line curving from the cartilage of the eighth right rib to that of the seventh left rib. On the 2nd the symptoms of general peritonitis were fully marked. He died on the morning of the 3rd. The urine was frequently examined, but gave no signs of albumen. He was treated chiefly with moderate leeching, small blisters, laxatives, quinine, diaphoretics and anodynes.

Inspection eight hours after death.—Abdomen. About two pints of straw-coloured serum were contained in the cavity of the peritoneum. The intestines were generally distended with

flatus; their peritoneal surface presented a dusky hue chiefly where the convolutions were in contact, with flakes of lymph here and there. The lymph effusion was abundant on the convex surface of the liver, which seemed somewhat compressed, and adhered to the diaphragm by friable bands. The thin edge of a part of the concave surface of the left lobe of the liver was firmly adherent to the stomach, the transverse colon, and the hepatic flexure. Easily separable adhesions also existed between the right lobe of the liver, the fundus of the gall-bladder, and the lateral part of the diaphragm. The omentum was matted over the ascending colon, and reached as far as the right abdominal ring. On separating the adhesions between the concave surface of the liver and the stomach, a thick layer of friable lymph was seen on the surface of the latter, and on the duodenum, with a few ounces of a sero-puriform fluid, which seemed to proceed from a puriform sac, chiefly formed in the gastro-hepatic omentum. One part of its wall was in relation with the inferior surface of the lobulus Spigelii. This lobe was compressed, its tissue of a dark-red colour, mottled, and presenting near the surface and in relation with the wall of the sac, two or three purulent deposits, each the size of a small bean. The transverse or portal fissure, with the large blood-vessels and duct, were not involved. No other traces of abscess were detected in any other part of the liver, which was of normal size, and extended from the level of the fifth to the ninth rib. When incised in various directions its surface presented an olive-green colour, and was somewhat indurated, seemingly, from a state of commencing cirrhosis. The upper surface of the right lobe was much puckered, probably from old lymph deposit. The mucous membrane of the stomach was covered with a large quantity of pultaceous mucus, but its structure was in every respect healthy. The mucous membrane of the duodenum presented a dark-red colour, but it also was normal in structure.—*Chest.* The lungs were freely collapsed and crepitating. Old adhesions connected in places the costal to the pulmonary pleura in both sides.

246. *Three Abscesses in the Liver.—Death from General Peritonitis, probably caused by Perforating Ulcer of the Colon.*

Hajee, a Mussulman labourer, of thirty years of age, after fifteen days' illness with fever and pain of abdomen, was admitted into the clinical ward on the 5th November, 1852, with the

symptoms of general peritonitis well marked: he died on the 12th.

Inspection eleven hours after death.—Body somewhat emaciated.—*Abdomen.* The surfaces of the peritoneum at the lower part of the abdomen were adherent, and the convolutions of the intestines were united together by yellow coagulable lymph, and the omentum was adherent to them. In all, three sacs were formed by the agglutination of the peritoneal surface of the bowels—to the bladder in one of them; and to the walls of the abdomen in the other two. One of the latter sacs was situated in the right iliac region, and contained about twelve ounces of turbid flaky serous matter, apparently mixed with pus. The liver projected considerably below the margin of the ribs, and was of mottled appearance. Opposite the seventh, eighth, and ninth right ribs, and beyond their cartilages, the liver was found adherent, and on tearing these adhesions a quantity of pus exuded from an abscess in its substance. There was also a small abscess about the size of a walnut on its anterior surface, and a large abscess about the size of a small cocoa-nut was found in the centre of the convex portion of the right lobe of the liver. Its sac was imperfectly formed, and its cavity contained loose flocculent lymph matter. In the thin margin of the left lobe, a small cheesy nodule was found. Situated immediately above the pancreas, and extending upwards, there was a large purulent sac, which had become adherent to the stomach, but did not open into any of the viscera, or communicate with the liver. The substance of the pancreas formed its lower boundary. The kidneys were paler than natural, and the tubular portion deficient in point of size. About the middle of the colon, there was a large ulcer about the size of a rupee, with red, raised edges. This had perforated the bowel, and an opening, admitting of the passage of the handle of a scalpel, existed; the margins of the opening were rounded. The head of the colon was considerably thickened and contracted. The colon as well as the rectum, presented one or two ulcers which had undergone repair. With the exception of the one above mentioned, no other active ulcer was to be found in any part of the intestines. The gall-bladder was full of bile.—*Chest.* Slight adhesions existed on the right side between the two layers of the pleura. No fluid on either side. The lower lobe of both lungs, especially the left one, were found of a dark blue appearance; they did not crepitate, sunk in water, had an elastic feel, and were smaller than natural. The other parts of both lungs were healthy and crepitating. The walls, substance, and valves of the heart were natural.

The details with which we have just been engaged have shown that circumscribed peritonitic puriform sacs, empyema, and puriform general peritonitis, are events which occur in the course of hepatic abscess. It has been suggested that this probably depends upon the cachectic state of the individuals who are the subjects of these morbid processes. But here another question arises. Can we relate these events to particular forms of cachexia? If so, and if we have diagnostic symptoms of these cachexiæ, it is evident that we shall be in possession of knowledge likely to bear on prognosis and treatment. Is this tendency to inflammation-extension with lymph degeneration related to the cachexia of malaria, scorbutus, struma, mercury, imtemperate spirit drinking, syphilis, prolonged elevation of temperature, habitual residence in a vitiated atmosphere, or that cachexia which coexists as cause or effect with Bright's disease of the kidney? My own observations are insufficient to throw any steady light on these important practical questions. It must be for future inquirers to follow out their interesting details.

It is very likely that subsequent investigation will show a relation between these secondary inflammations and the cachexia of Bright's disease.

On referring to my cases with a view of testing the probability of this opinion, I am disappointed by finding them so frequently defective. Many of them were recorded at a time when attention had not as yet been steadily fixed on this important part of pathology. Yet imperfect as they are, granular degeneration of the kidney is noted in 6 of the 18 cases; in the remaining 12, the state of the kidney is not described.

Character of the contents of Hepatic Abscesses.—The numerous cases detailed in these pages show so well

the differences in appearance presented by the pus in hepatic abscesses, that I should have thought it unnecessary to allude to the subject more particularly. But there are statements made on this point by Rokitsky and Budd, so opposed to the tenor of my own observations, that it would be an omission on my part not to advert to them.

Rokitansky says, "A large abscess of long standing, invariably contains pus mixed with a considerable amount of bile, which arises from the communication established between the cavity and larger gall ducts."*

We are not told of the number of cases on which this general statement is grounded; nor whether the presence of bile was determined from the general colour of the pus, or by the microscope or by chemical tests. Assuming from the expression "considerable amount of bile," that the inference has been drawn from the colour as appearing to the naked eye, I find myself unable to assent to the doctrine of this eminent pathologist.

There are before me 98 cases in which the morbid appearances of hepatic abscess are described, and 10 others in which the contents were artificially discharged. They were all observed and noted by myself; but of only 4 (198. 215. 249. 269.) is a bile-tinged state of the pus recorded; and I can hardly think that so notable a character, if existing, would in 104 cases have failed to attract my attention. I place the more confidence in this result of personal inquiry, for since becoming aware of the opinion of Rokitsky, and feeling how opposed it was to my previous belief, I have spoken with several of my professional friends, whose experience in this form of disease has been considerable, and have

* Pathological Anatomy. Sydenham Society, vol. ii. p. 132.

hitherto found that their conclusions coincide with my own. The statement of the able German pathologist cannot be held to apply to hepatic abscess in India, as hitherto observed.

In Dr. Budd's work on Diseases of the Liver are the following remarks:—

“Many of the old writers describe the pus of abscess of the liver as being generally red or claret-coloured, but this statement is incorrect. In all the abscesses of the liver that I have examined, the pus was white or yellowish, just like that of a phlegmon. The error of those who have described it as being reddish, resulted, perhaps, from their having met with a case in which the abscess opened into the lung, and in which the pus, in its passage through the lung, became mixed with blood and broken-down pulmonary tissue. They describe the matter *expectorated*, and not the matter contained in the abscess. It is not very uncommon for an abscess of the liver to open into the lung. Several instances of this kind have fallen under my own notice, and in all of them the matter expectorated was a dirty red, or brownish pus. The reddish colour of the pus was acquired on its passage through the lung. The matter in the abscess was yellowish or white.”*

Cases 210. 259. 268. 273. 275. 285. 297. 301. confirm the statement of the old writers, that the pus in hepatic abscess is sometimes of a red colour, and do not accord with the opinion above expressed by Dr. Budd.

Haspell having observed a pink colour of the contents in two of his three successful cases of puncture of hepatic abscess, has inferred that this colour is a condition of the early stage of the abscess, and that when present in punctured abscess it justifies a favourable prognosis. These inferences, deduced from very limited data, are not supported by my cases 297. 301.

* On Diseases of the Liver. Second edition, p. 98.

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